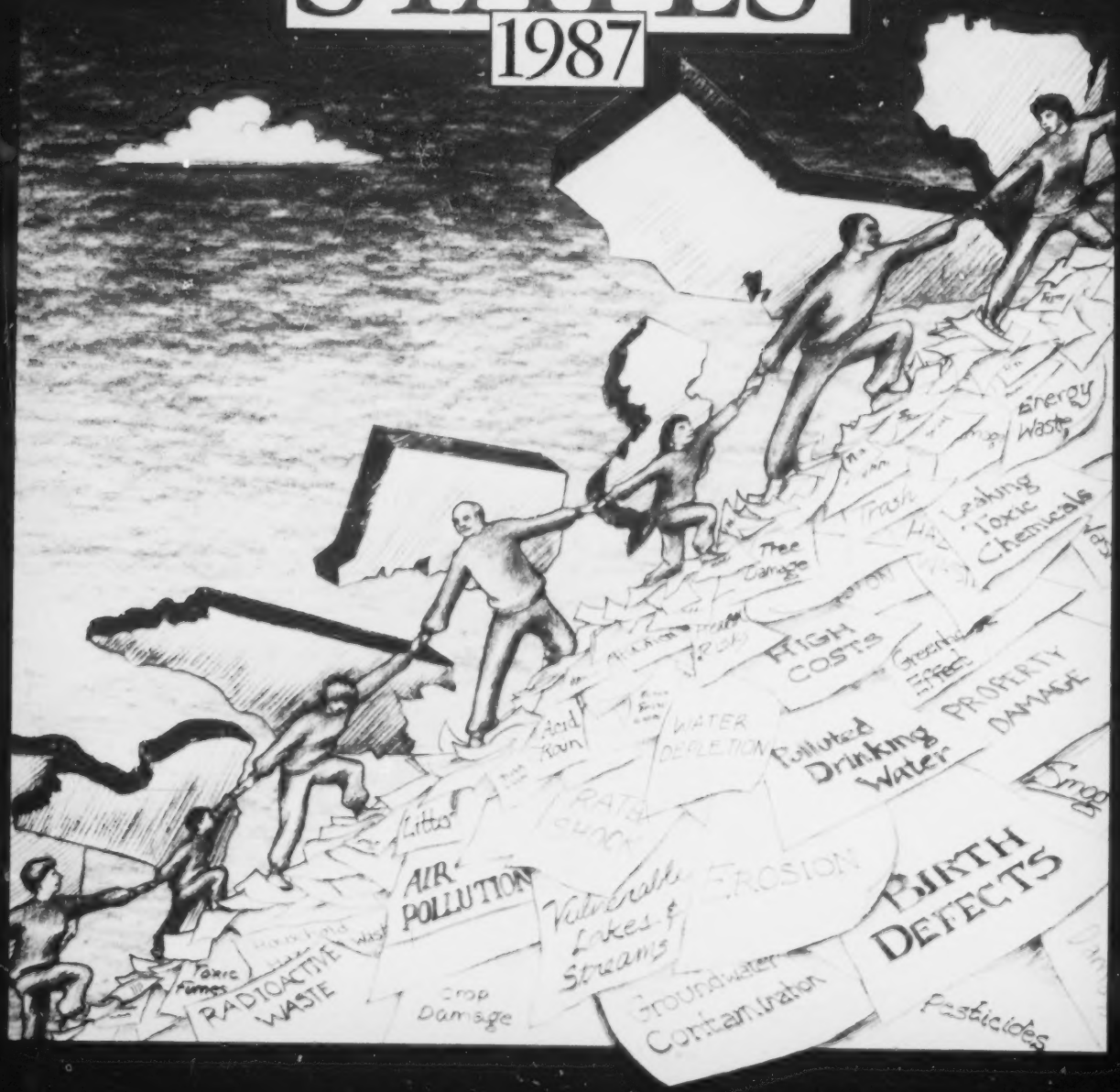
R4950-1.1F 6/87

THE STATE OF THE STATES

1987



FUND FOR RENEWABLE ENERGY AND THE ENVIRONMENT

The Environmental Turning Point

Federal and state governments are now writing our environmental future. Important choices are being made about the risks and costs we and our children will face. Since 1981 the federal government has been steadily reducing its role in regulatory protection and shifting far greater responsibility to the states. While budgets have declined, problems have mounted. As a result we continue to risk public health and destroy our most important natural assets through air pollution, water degradation, soil erosion, and the generation of toxic wastes. But, fortunately, American support for a safe and healthy environment appears to be rising dramatically.

Americans attach unprecedented importance to a clean environment. A recent Harris survey found that 93 percent of the people believe that water pollution is a serious problem, 92 percent say the same about toxic wastes, and 79 percent are concerned about acid rain. Politicians are beginning to get the message, as shown by the successes of many pro-environment candidates and issues in the 1986 elections. A recent Hudson Institute study predicts that the baby boom generation (born between 1946 and 1954) "will favor legislators who seek to expand individual opportunities and environmental protection."

The current reality is that a budget deficit of $220 billion and increased defense spending have forced significant reductions in a number of effective and badly needed programs. Funding and attention given to air pollution programs has slackened, and even hazardous waste programs receive only enough support for limited action. States which in the past have relied heavily on federal support of their environmental protection efforts were badly gored by the budget cuts of the early eighties.

The country now faces increasing damage from water degradation, soil erosion and generation of toxic wastes. New environmental hazards whether they be pesticides in drinking water or toxic air pollution from waste incineration plants seem to appear every year. As a result, states that maintain static environmental programs are overwhelmed by rapidly growing problems or respond only after a catastrophe has struck.

The turning point which may halt this steady degradation is more than just a shift in voting patterns. In the past ten years, traditional concerns for conserving natural resources have been joined by a recognition of the need to protect public health, and more recently by the realization that sustained economic growth is dependent on protecting soil, water, air, and other natural resources. Because greater environmental responsibility has been shifting to the states, citizens can have a greater voice at the local level over what risks they are, or are not, willing to face.

One of the more pernicious effects of recent federal budget cuts is the increasing inequity of state funding options. It is essential that the federal government rededicate itself to environmental protection so that present economic disparities do not translate into larger environmental disasters in the future.

Good intentions are not enough. Economic problems and federal budget cuts mean that many states are faced with pressing needs in education, housing, and medical care, as well as the environment. All of these issues must be addressed. But because we don't have precise measures of the economic and social value of a secure environment, we sometimes underestimate its importance. If we continue to let essential environmental support systems deteriorate, everyone will suffer.

The Fund for Renewable Energy and the Environment has created *State of the States* as a means of calling attention to states that have effectively responded to mounting environmental problems. In the wide variety of programs introduced in the past few years, states have a great deal to learn from one another. No state is doing everything right and none is doing everything wrong, but all must begin taking more responsibility in shaping their own futures. The health of people and the environment and the strength of states' economies will depend on their ability to do so.

State of the States is the first in a planned series of annual reports that assess where the states stand on key environmental topics such as air pollution reduction, soil conservation, solid waste and recycling, hazardous waste management, groundwater protection, and renewable energy and conservation. It is not an empirical study of the environmental quality of the states but a subjective assessment of total program strengths. We hope with this report to develop an initial benchmark against which states can measure their progress. We also hope it will be a starting point for more comprehensive assessments of these and other environmental issues.

State of the States provides both a national overview of particular problems and a ranking of the states according to program strengths. The ranking takes into consideration the degree of soil erosion, groundwater consumption, or air pollution in a state and then evaluates the program response through selected indicators of legislation, enforcement, funding, and other considerations. While much innovation is taking place, out of necessity, only those elements that have been made into law, formal standards, or guidelines, are considered.

Investing in environmental protection means protecting the present and investing in the future. *State of the States* represents a beginning. The intent is to raise the priority of environmental issues at state and community levels. As the first in a planned series of reports, it is but one small contribution to governors, state legislators, city and county officials, and citizens in developing goals for our common fight to protect and efficiently utilize our natural resources. We hope that those out in the trenches will let us know if the report is useful and will make suggestions on how we can make it more effective in the years ahead.

Tina C. Hobson
Executive Director
Fund for Renewable Energy and
the Environment

The Fund for Renewable Energy and the Environment (FREE) was formed in August 1986, replacing the Solar Lobby and the Center for Renewable Resources. FREE's expanded mission will build upon the important work done by these two previous organizations and provide new tools to state and local decisionmakers to take action in their own behalf.

THE STATE OF THE STATES

By Scott Ridley

Executive Summary
2-4

State Rankings
5

Air Pollution Reduction
6-9

Soil Conservation
10-13

Solid Waste & Recycling
14-17

Hazardous Waste Management
18-21

Groundwater Protection
22-25

Renewable Energy & Conservation
26-29

State Ranking Graphs
30-31

Notes
32-36

References
36

The Fund for Renewable Energy and the Environment (FREE) is a non-profit, tax-exempt educational organization working toward a sustainable future by promoting a safe and healthy environment. For further information on FREE or to obtain additional copies, write to: Fund for Renewable Energy and the Environment, Suite 638, 1001 Connecticut Avenue, N.W., Washington, D.C. 20036 (202-466-6880). Single copies are $10 each; write or call for bulk rates.

©Copyright, Fund for Renewable Energy and the Environment, February 1987.

EXECUTIVE SUMMARY

. . . There is a deepening realization of the high costs and tradeoffs.

The United States has reached a turning point in environmental progress. As costs for protection of public health and natural resources have risen in the past five years, the federal government has retreated from its traditional support. As a result, momentum on key issues has stalled and an increasing burden for environmental protection has been shifted to state and local governments. The question is whether states will have the resources to maintain and expand essential programs, and win the cooperation of industry to reduce waste and pollution. Current trends indicate deepening trouble ahead.

The last fifteen years have brought impressive progress in cleaning up the environment. The smog in many cities has receded. Rivers once fouled by chemicals and sewage are cleaner. Overburdened landfills have generated broad debate on recycling and alternative waste management. The discovery of contamination at thousands of hazardous waste dumps has spurred clean-up efforts and programs to protect groundwater. And renewable energy sources have pushed forward to supply nearly 10 percent of the nation's energy needs.

From the vantage point of 1970, a whirlwind of activity has swept through government and private industry to protect our health and natural resources. But the change has also brought expanded awareness of the serious public health and resource problems we face.

A glance at the headlines shows bright hopes for the environment are mixed with turbulent uncertainties. Each week seems to bring new revelations of leaking underground storage tanks, hazardous waste dumps, contaminated drinking water, controversy over landfills and garbage incineration plants, and threats of far-reaching climatic changes from air pollution.

Although hope remains strong, the facts and trends behind the news stories indicate deepening trouble. On many environmental issues, progress of the last decade has stalled. On other issues it has begun rolling backward. Air pollution, for example, is increasing once again and funding reductions for air programs threaten to cripple monitoring in some areas. After a hopeful start, hazardous waste cleanup has become mired in court suits, inadequate technology, and funding sufficient for only limited actions. Government support for renewable energy technologies and conservation has been slashed. Cutbacks in key soil conservation programs threaten to undermine efforts to save cropland. And federal assistance to help manage more than 150 million tons of garbage each year has been reduced to almost nothing.

Previously, the federal government assumed major responsibility for environmental programs. The 1970s were a time of expanding legislative and fiscal commitment to improve the nation's air, land and water. Pollution standards were set and tax money was earmarked for environmental cleanup. Backed by this support states initiated and expanded local projects.

In the early 1980s the situation began to turn around. The Omnibus Budget Reconciliation Act and the Economic Tax Recovery Act of 1981 set the federal government on the road to slashing many domestic programs. The federal grants-in-aid contribution to all such programs dropped nine percent as part of the total state budgets from 1981 to 1986, while spending on other areas such as national defense rose from $172.5 billion to $267.8 billion during the same period.

Funding for key air pollution reduction programs was frozen at about $95 million per year (a reduction of 24 percent in real value). Funding for key soil conservation programs was reduced from $365 million in 1981 to $348 million (in real value) in 1986. Funding for state solid waste programs was cut from $13 million in 1981 to zero in 1986. And federal appropriations for key state energy conservation programs were reduced from $802 million in 1981 to $427.5 million in 1986.

At the same time the federal government was making these cuts it began to shift increasing responsibilities to state governments under the philosophy of New Federalism. The result for most states has been a series of tough choices. Funding for environmental problems are often sacrificed to pay for important education, housing, and highway repair programs. Unless environmental threats are immediate and dramatic, action is frequently delayed, allowing public health dangers, long term environmental damage, and the ultimate cost for remedial action to increase. States with tight budgets are especially caught in this dilemma.

With full recognition of these trends and the difficulties state governments are facing, this report briefly examines the historical relationship between the federal government and the states, and provides an initial assessment of what has been accomplished in six environmental topics: air pollution reduction, soil conservation, groundwater protection, hazardous waste management, solid waste and recycling, and renewable energy and conservation. It is not intended to be a comprehensive assessment of environmental conditions in each state, but an accurate measure of key legislation and programs states have put in place to assure on-going protection of air, water and soil.

The facts show both the progress and difficulties ahead:

- **Air Pollution Reduction**—While thick black smoke no longer curls from the stacks of most industrial plants and pollution from automobiles and trucks has been reduced, progress in air pollution has reached a turn in the road. Funding for air pollution work in many states is being cut back and further progress may be restricted. Nationwide, the real value of federal funding for air programs decreased by 24 percent between 1979 and 1984. As a result air monitors have been cut back by 29 percent of the states, only limited work is expected on acid rain, new toxic air pollution programs may not be initiated or fully implemented, and reduction targets for standard pollutants such as sulphur oxides, carbon monoxide, and ozone are not expected to be met.

The ten top states for air pollution reduction are: CA, CT, NJ, WI, MI, NC, OH, PA, VA, WA.

- **Soil Conservation**—Since the early 1970s the nation's farmland has been battered by weather, the economy, and political storms. According to the most recent reports, the amount of cropland needing erosion control has increased in 26 states since 1977, decreased in 21 states, and remained the same in 2 states. Soil related damage on farmlands is estimated to run between $2 billion and $13 billion annually. Federal incentives which have encouraged cultivation of highly erodible soils have hopefully been corrected by conservation reserve and "sodbuster" provisions included in the 1985 farm bill. But proposed funding cuts have raised doubts over the potential of these programs. Time will tell if the new soil conservation programs can counter economic pressures to maximize production and halt the trend toward increased erosion that began in the mid-1970s.

The top ten states for soil conservation are: IA, IL, DE, MD, OH, SD, WI, MI, NC, VA.

- **Groundwater Protection**—Because of the high visibility of water contamination from pesticides, hazardous waste dumps, and leaking underground storage tanks, half the states have initiated plans for groundwater protection. The US Geological Survey has mapped the primary aquifers across the country, and many states are moving to fill in the details on those maps. Federal legislation is expected in 1987 to provide guidelines for states to develop comprehensive groundwater programs. The choice may come down to setting a goal to require nondegradation of any groundwater supplies, or

Combined Ranking of State Programs

Rank	*State*	*Total Points (out of 60)*	*Rank*	*State*	*Total Points (out of 60)*
1	Wisconsin	49	25	Kansas	29
2	California	48		Oklahoma	29
3	New Jersey	47		Tennessee	29
4	Connecticut	44		Washington	29
5	Michigan	43	29	Kentucky	28
	New York	43		Vermont	28
7	North Carolina	42	31	Arizona	27
8	Florida	41	32	Georgia	26
	Illinois	41		Texas	26
	Massachusetts	41	34	Delaware	24
11	Iowa	39		Colorado	24
12	Minnesota	38	36	Montana	23
13	Maine	36		Nevada	23
	Indiana	36		New Mexico	23
15	Oregon	35		South Dakota	23
16	Maryland	34	40	Louisiana	21
	Ohio	34	41	Hawaii	19
18	Virginia	33	42	Alaska	18
19	New Hampshire	32		Arkansas	18
	Pennsylvania	32		Idaho	18
21	Missouri	31	45	Alabama	16
	Nebraska	31		North Dakota	16
	South Carolina	31		Utah	16
24	Rhode Island	30		Wyoming	16
			49	West Virginia	15
			50	Mississippi	14

selecting which aquifers we will allow to become contaminated.

The top ten states in groundwater protection are: NY, CT, FL, KS, MA, MI, NM, NC, WI, WY.

- **Hazardous Waste Management**—The principal focus of hazardous waste activity has been the federal Superfund program. But between 1980 and 1986, only 13 sites were cleaned up and removed from the Superfund list. EPA's Emergency Response and Remedial Investigation System list contains some 22,000 sites needing attention, and the Office of Technology Assessment estimates that as many as 600,000 sites may eventually require remedial action. In response to the rapidly expanding number of hazardous waste sites needing action and the lethargy of the federal Superfund program, 29 states have put their own Superfund provisions in place. Because states have only limited funding, the key to reducing health threats from hazardous waste appears to rest with how much responsibility industry is willing to take for cleanup and waste reduction. Another emerging element that may spark action is citizen "right-to-know" provisions in hazardous materials law which entitle citizens to know what chemicals are being stored, manufactured, dumped, or processed in their communities.

Nine states with the most comprehensive hazardous waste programs are: NJ, CA, MA, MI, MN, FL, KS, MO, NY.

- **Solid Waste and Recycling**—The 1970s witnessed an explosion of interest in recycling and alternatives to dumping 150 million tons of garbage in landfills each year. But markets for recycled materials and support for waste alternatives subsided in many states despite advances in technology. In the past few years federal support has swung behind the option of burning trash to create energy. But increasing costs and controversy over pollution from incineration plants has brought a number of city and state governments to consider new solid waste management systems that include large scale recycling, composting, and refuse-derived fuel plants.

The eight states which have taken the lead in addressing solid waste management problems are: NJ, CA, CT, MN, KY, MI, NY, WI.

- **Renewable Energy and Conservation**—Although renewable energy sources now provide nearly 10 percent of the nation's energy, support for development has been severely cut back. Federal renewable energy tax credits have been eliminated for residential systems. The Solar Energy and Energy Conservation Bank has been zeroed out of the federal budget. And federal research funding for renewable energy technologies has been slashed from $771 million in 1981 to $176 million in 1986. Coupled with this trend, only ten states have implemented laws and authorities to press utilities for least-cost energy development and seven of the twenty-four states with solar and conservation tax credits have seen these provisions expire in the last two years.

The six states with the best renewable energy and conservation policies are: CA, WI, IN, ME, MA, OR.

The general conclusion that can be drawn from these key topics is that the nation has reached a turning point in environmental progress. There is not only a recognition of the seriousness of the problems, but also a deepening realization of the high costs and tradeoffs needed to save soil, produce and use energy efficiently, and protect air and groundwater from contamination.

Cleanup of the 10,000 worst hazardous waste sites, for example, is expected to cost over $100 billion and take decades to complete. Reducing the volume of hazardous waste produced will likewise take time and involve hard choices. The same is true for reduction of solid wastes which will require tough decisions for the packaging and bottling industries. Some of the tradeoffs involve institutional changes as well. Development of renewable energy and greater energy efficiency, for example, raises the prospect of decentralizing the utility industry.

These are not decisions that will come easily. Issues of public health and protection of resources must be weighed with short and long term economic growth demands. Roles to be played by federal and state agencies need to be defined and coordinated. And most importantly, citizens living in communities affected by these decisions must be given a strong voice in decision-making. As responsibility for an array of research, monitoring, enforcement, and cleanup continues to shift to the states, the public's role will be vital in assuring adequate funding and tradeoffs to protect public health, resources, and sustained economic growth.

This report briefly outlines the progress states have made thus far, and the general stall that has taken shape in the past few years as realization of the costly dilemma of cleaning up the environment has emerged. The ranking of the states points out the relative strength of the legislation and programs. Not surprisingly, some states with the worst problems have the best programs. Also states with high per capita income are generally able to direct more funds to environmental protection. Despite tight funding, many states have shown great ability in developing innovative programs. But artful papering of environmental problems with legislation should not be mistaken for action and progress.

Wisconsin, which tops the combined rating list, did not rank first in any one category but showed a consistent high level of program strength—demonstrating broad commitment to the environment and public health. Ironically, Mississippi, which ranked last, did not receive needed federal assistance and funding because of a lack of state funding. A number of states with low per-capita incomes are caught in this dilemma. Details of the ranking process are contained on pages 32-33.

The matrix in each topic section shows that the problems and programs vary widely and that there is much states can learn from one another to achieve real and lasting gains. Hopefully, this information will encourage broader public understanding of the difficult decisions and tradeoffs ahead and the options within reach of each state. Readers interested in more extensive data on any of the topics can request one of the six appendix packets compiled in conjunction with this report. Ordering information is listed on the inside back cover.

STATE RANKING BREAKDOWN*

	AIR PROGRAMS	SOIL CONSERVATION PROGRAMS	GROUNDWATER PROGRAMS	HAZARDOUS WASTE PROGRAMS	SOLID WASTE PROGRAMS	RENEWABLE ENERGY & ENERGY CONSERVATION	TOTAL	RANK
AL	3	3	2	3	3	2	16	26
AK	7	3	3	2	2	1	18	25
AZ	7	3	7	5	2	3	27	19
AR	1	3	2	5	3	4	18	25
CA	10	3	7	9	9	10	48	2
CO	4	6	4	3	4	3	24	21
CT	9	6	9	4	9	7	44	4
DE	1	8	6	3	4	2	24	21
FL	7	4	9	8	6	7	41	7
GA	4	5	7	4	3	3	26	20
HI	4	4	3	2	2	4	19	24
ID	2	1	6	1	2	6	18	25
IL	7	9	5	7	7	6	41	7
IN	6	5	4	6	7	8	36	10
IA	5	10	5	5	7	7	39	8
KS	2	5	8	8	4	2	29	17
KY	7	3	1	6	8	3	28	18
LA	5	3	3	7	2	1	21	23
ME	3	6	7	6	6	8	36	10
MD	3	8	7	6	6	4	34	12
MA	6	4	8	9	6	8	41	7
MI	8	7	8	9	8	3	43	5
MN	5	6	5	9	9	4	38	9
MS	1	3	2	4	2	2	14	28
MO	5	6	7	8	1	4	31	15
MT	2	5	6	3	1	6	23	22
NE	4	6	6	2	6	7	31	15
NV	2	6	4	2	2	7	23	22
NH	6	5	5	7	5	4	32	14
NJ	9	6	7	10	10	5	47	3
NM	1	2	8	5	1	6	23	22
NY	5	5	10	8	8	[illegible]	43	5
NC	8	7	8	6	6	[illegible]	42	6
ND	1	3	4	2	3	3	16	26
OH	8	8	4	5	5	4	34	12
OK	5	5	5	4	7	3	29	17
OR	6	2	7	5	7	8	35	11
PA	8	6	5	5	3	5	32	14
RI	6	4	6	4	7	3	30	16
SC	6	5	7	5	2	6	31	15
SD	1	8	6	2	2	4	23	22
TN	3	3	4	7	5	7	29	17
TX	7	2	2	5	3	7	26	20
UT	3	4	3	2	1	3	16	26
VT	3	3	5	6	4	7	28	18
VA	8	7	6	2	3	7	33	13
WA	8	1	6	5	5	3	29	17
WV	2	5	2	4	1	1	15	27
WI	9	8	8	7	8	9	49	1
WY	1	3	8	1	2	1	16	26

* see graphs on pages 30-31 and notes on pages 32-33

AIR POLLUTION REDUCTION

...How much work the states will be able to take on with new air pollution program remains uncertain.

Driving through Pittsburgh at night in the early 1970's the sky was often a ceiling of black smoke tinted by the city's lights. Outside Houston the heavy odor of petrochemicals would drift up over the highway. In Los Angeles and most other major cities daily weather reports frequently included alerts on the health danger of smog—a mixture of pollutants from buildings and car and truck exhaust.

Much of the more visible pollution once dumped into the air is now gone. Pittsburgh was recently chosen as the nation's most liveable city. Tall factory stacks no longer billow heavily laden black smoke in most areas. There are fewer smog warnings. And although pollution reduction goals set more than a decade ago have been steadily pushed back, the air is generally cleaner than it was in the early 1970s. In a simple dollar measure, one 1982 study found air pollution reduction costs of $17 billion resulted in saving $21.4 billion in health and property impacts.[1]

The primary reason for this progress is the federal Clean Air Act. First passed in 1963, the Clean Air Act set up a partnership between the federal and state governments to reduce air pollution. Amendments passed in 1970 put teeth into the law. The new Environmental Protection Agency was directed to adopt National Ambient Air Quality Standards for major pollutants. States were to develop State Implementation Plans (SIPs) to detail how they would meet the standards.

Seven major pollutants were targeted for reduction: particulates (ash, dust, etc), sulphur oxides, nitrogen oxides, carbon monoxide, hydrocarbons, ozone, and lead. The law required that primary standards to protect public health be met by 1975. Secondary standards to protect property were given extended deadlines. The states were to focus on "stationary" sources of pollution such as factories, commercial buildings, and dumps. And the federal government kept the authority to control the levels of pollutants from cars and trucks (except for California which already had standards in place).

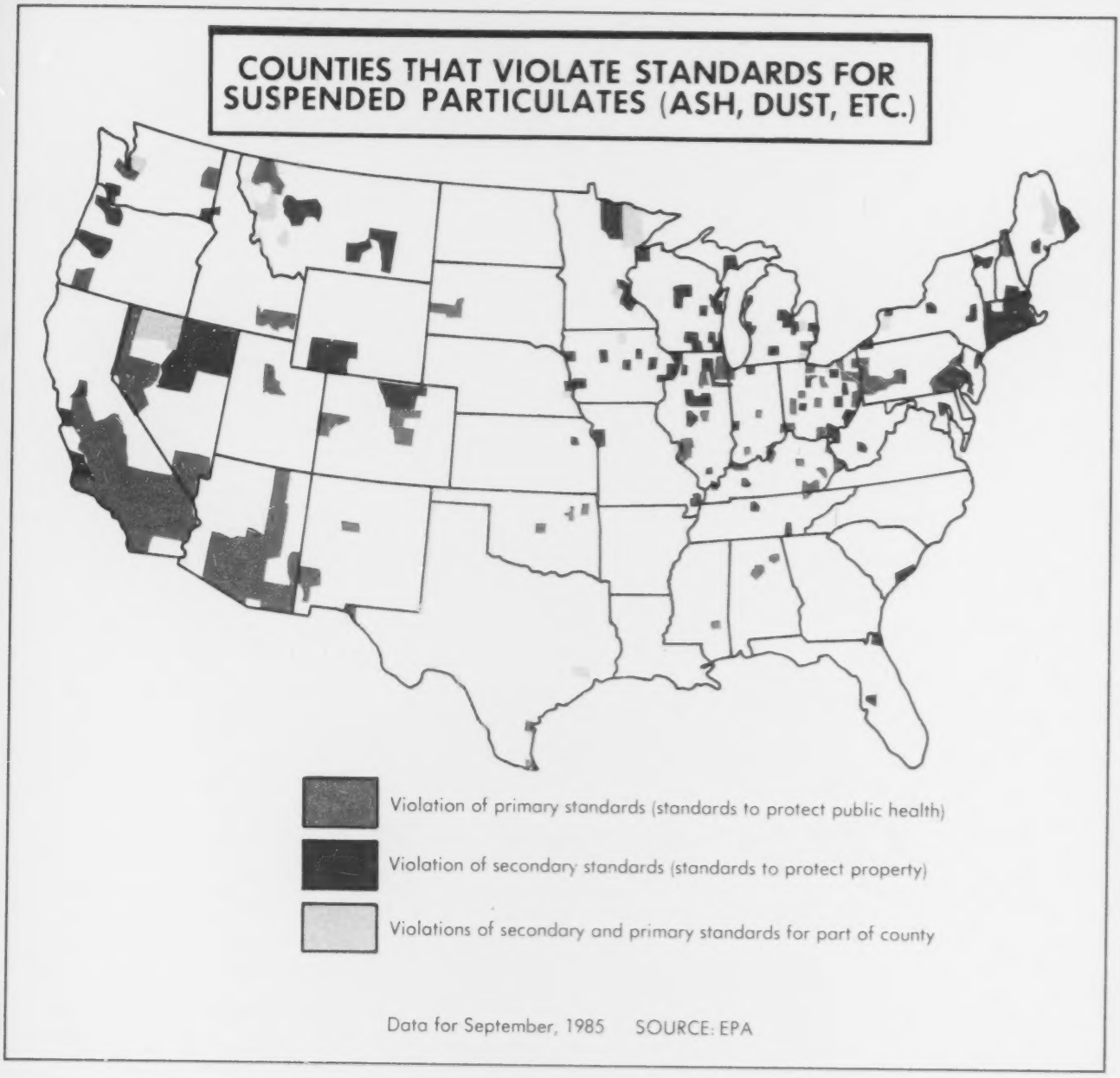
The problem was that the law failed to spell out what would happen if standards were not met. As a result some states did little or nothing to implement plans. By 1975 it was apparent that the reduction goals were not going to be met. After heated debate, Congress passed a new set of amendments to the Clean Air Act in 1977. If the amendments in 1970 had teeth, those passed in 1977 offered a convincing bite.

New deadlines were set to achieve health related reductions in pollution by December 31, 1982. Attainment of standards for ozone pollution or severe carbon monoxide problems were targeted for December 31, 1987. The secondary standards to protect property were to be met "as expeditiously as possible."

In order to assure that states would take these deadlines seriously, economic sanctions were put in place. Any state which had a nonattainment area was required to submit a new implementation plan. If the plan was not submitted and approved by EPA by July 1, 1979, construction of new industrial sources of air pollution could be prohibited and federal funds for highways, housing and sewage treatment plants could be withheld. Courts were also given authority to enforce any sanctions, if EPA failed to do so.

When the 1982 deadline arrived, most of the states failed to meet reduction goals for one or more pollutants. There were a number of reasons for this. Beginning in 1980, for example, EPA had allowed a new concept—emissions trading and a "bubble" approach— to accommodate the conflict between industrial expansion and the need to reduce pollution. In 32 states industries were allowed to buy and sell emissions credits to gain the cheapest pollution reduction for a given "bubble" area. A study published by the Conservation Foundation in 1986 found that although there had been considerable financial savings, the program accomplished few reductions in pollution.[2] As of December 1985, 22 states still needed to submit revisions of implementation plans. The threatened bite of sanctions in the law was apparently not strong enough. Since 1979 113 construction bans were put in place and three areas were placed under funding restrictions as sanctions for noncompliance.[3]

While the recession and increased energy efficiency slowed the growth of industrial air pollution, budget pressures and the need to attract and keep industry eroded the ability of some


COUNTIES THAT VIOLATE STANDARDS FOR SUSPENDED PARTICULATES (ASH, DUST, ETC.)
Violation of primary standards (standards to protect public health)
Violation of secondary standards (standards to protect property)
Violations of secondary and primary standards for part of county
Data for September, 1985 SOURCE: EPA

states to move ahead with their programs. The "easy" gains had already been made. An EPA study which compiles the monitoring data of the past several years reveals the general impact of these complex events and the difficult point states reached.

Between 1975 and 1984 ambient levels of total suspended particulates were reduced by 20 percent by mass. But in 1984, particulate emissions increased 4 percent and ambient levels increased 2 percent. Sulphur dioxide, which contributes to acid rain and can cause respiratory damage also increased two percent between 1983 and 1984 after a decline in ambient levels of 36 percent. Carbon monoxide levels which had declined 34 percent between 1975 and 1984, decreased only 1 percent in 1984. Nitrogen dioxide which contributes to pneumonia and bronchitis increased from 1975 to 1979, decreased through 1983, and increased slightly in 1984. Ozone levels which had decreased 17 percent appeared to remain even in 1984. And ambient levels of lead—which can cause irreversible damage to the brain, kidneys, nervous system, and circulatory system—decreased 70 percent at 36 urban sites from 1975 to 1984, and between 1983 and 1984 declined 7 percent.[4]

Actions undertaken by the states to achieve and maintain this progress vary widely. California, which has severe air pollution problems because of metropolitan areas located in valleys, pioneered the most extensive air pollution

AIR MATRIX

	Number of Counties with SIP Deficiencies 1986	Criteria Pollutants Exceeding Primary Standards in One or More Designated Area[1]	Total Number of Monitors for Criteria Pollutants[2]	Total Enforcement Actions[3]	EPA Sanctions Imposed as Consequence for SIP Deficiencies[4]	Toxic Pollutant Control Program in Place	Acid Deposition Control Program in Place	Conducts Research on Acid Rain	1985 Total Air Program Budget	1982 Total Air Program Budget
AL	4	S,O,T	54	1,365	•	•		•	$2,034,531	$ 1,735,000
AK		C,	37	250				•	949,000	—
AZ	17	C,S,O,T,	78	467	•	•			1,742,200	1,433,300
AR			37	691		•			961,011	1,120,028
CA	35	C,N,O,T,	455	3970	•	•		•	47,879,000	56,406,000
CO	6	C,O,T,	107	470					4,382,000	3,313,000
CT		C,O,	120	1,196		•		•	4,133,820	—
DE		O,	31	177					1,083,962	—
FL	4	S,O,	250	822					3,903,501	—
GA	1	C,O,	23	2,797		•			2,744,943	2,406,633
HI		S,T,	27	142	•				871,000	752,000
ID		C,T,	24	531					691,000	—
IL	28	C,S,O,T,	213	4,892	•	•		•	4,871,600	5,033,600
IN	24	C,S,O,T,	119	2,220	•			•	4,209,137	3,661,181
IA	4	C,T,	86	1,923	•			•	1,031,050	1,178,042
KS	3	C,O,T,	31	2,695					988,428	—
KY	17	C,S,O,T,	184	1,700	•			•	3,167,100	3,355,900
LA	1	O,	66	2,399					3,482,000	2,960,000
ME		S,O,T,	127	533				•	948,700	763,400
MD		C,O,T,	110	646				•	3,318,161	2,194,808
MA		C,O,	99	2,053			•	•	4,814,000	3,967,000
MI	1	C,O,T,	161	1,853		•	•	•	4,557,100	4,627,100
MN	14	C,S,T,	70	1,087	•	•	•	•	2,677,131	—
MS		T,	28	687		•			1,121,000	1,108,334
MO	9	C,O,T,	139	1,442	•			•	2,870,900	—
MT	2	C,S,T,	111	181	•				870,000	797,000
NE	2	C,T,	74	2,696	•				359,852	270,481
NV	2	C,S,O,T,	38	210	•	•		•	536,553	445,821
NH	1	C,O,T,	68	278			•		792,488	—
NJ	18	C,O,	193	2,055		•		•	7,699,056	6,943,480
NM	1	C,S,T,	78	474	•			•	1,754,600	1,557,000
NY	3	C,O,T,	254	4,047	•	•	•		11,800,000	8,700,000
NC	2	C,O,	124	1,746				•	2,870,288	2,551,912
ND			43	235				•	820,399	916,956
OH	34	C,S,O,T,	390	3,869	•	n/a		•	4,453,278	3,786,921
OK	2	C,O,T,	95	702					1,917,169	1,739,000
OR	1	C,O,T,	37	948	•	•			6,377,000	6,084,000
PA	3	C,S,O,T,	223	3159		•		•	6,179,000	6,356,000
RI		C,O,	33	182				•	893,499	880,000
SC		C,O,	85	2,671		•			2,581,874	1,968,395
SD	1	T,	39	212				•	287,817	152,966
TN	2	C,N,S,O,T,	19	1,434	•	•		•	2,194,100	—
TX	8	C,O,T,	211	3,596	•	•		•	14,046,001	14,324,413
UT	1	C,S,O,T,	45	874	•				1,522,445	1,299,000
VT			13	132					606,752	618,000
VA	2	C,O,	153	1,381		•		•	4,886,557	4,571,083
WA	1	C,O,T,	131	627		•		•	1,629,620	—
WV		S,T,	77	538				•	1,710,535	—
WI		C,S,O,T,	159	1,749	•		•	•	3,837,000	3,272,000
WY			23	798					994,000	920,000

(for more extensive information see Air Appendix Packet)
(see notes on page 33)

program. In 1985 the state contributed nearly $50 million to the statewide air pollution control program (ten times that of most other states). Individual cities add to this effort with their own programs. One measure of the state's headway in this joint state-local effort is the fact that Californians witnessed the second lowest number of smog alerts in 1985 (83 compared to an average of 119) since 1964. State officials say the reason for this progress is that they control both mobile and industrial sources more stringently than the federal EPA and that they use regulations to help motivate development of new pollution control technologies. California's Air Resources Board has targeted an additional 25 percent reduction in emissions from cars and trucks in order to meet attainment standards by the year 2000.[5] But most recently, the steady growth of the air program in the 1970s has slowed and new toxic air, indoor air pollution, and acid rain programs are placing increased demands on the state.

Although reduction of the major criteria pollutants remains the cornerstone of air pollution control, newly discovered air pollution problems are demanding attention in every state. As in California, localized problems of indoor and toxic air pollution, regional problems from acid rain, and carbon dioxide build up in the atmosphere—the "greenhouse effect"—which threatens a global warming trend and sweeping climatic changes, and the global depletion of ozone, are adding a whole new agenda to air pollution prevention.

How much work the states will be able to take on with new air pollution problems remains uncertain. The partial success in meeting goals established by the Clean Air Act may foretell the future for new expensive air programs. The general indications are that the stall in progress could be lengthy. At least seven states reduced their air program budgets in 1985 and the federal government effectively froze its contributions. State and local agency grants totaled $94.3 million in 1981 and $96.3 million in 1986. According to the State and Territorial Air Pollution Program Administrators this trend has several impacts:[6]

- for the period of FY79- FY84 real values of federal funding for air pollution decreased 24 percent, and real value of non-federal funding decreased 6 percent;
- by 1984 air monitors had been cut back in 29 percent of the states;
- 47 percent of the most costly air monitors are in fair to poor condition and will need to be replaced during the next five years. Given the decrease in value of funding, and the high cost of monitors, further reduction of monitoring can be expected;
- unless significant new funding is appropriated, new programs or full implementation of programs for toxic air pollution may be delayed and programs for acid rain research and reduction are likely to be delayed at the state level;
- unless funding is maintained or increased current air pollution reduction deadlines will not be met.

The underlying issue in protecting the nation's air rests on how tradeoffs will be made with manufacturing, chemical, rubber, electric utility, automotive and oil industries. From the experience of the past decade and a half, it appears that the federal government will need to establish new incentives, support new monitoring systems and local enforcement, and encourage states and industry in efforts to carry out research. Without a renewal and strengthening of the federal/state partnership air pollution control may remain a hazy concept doomed to only partial realization.

AIR SNAPSHOT

California offers the best working model for air pollution reduction policies and programs. The program combines a state Air Resources Board made up of technical experts with representatives of 44 county and regional air quality agencies. The local agencies are primarily responsible for controlling emissions of industrial facilities and the board provides financial and technical expertise and assists in enforcement of standards. The board also oversees a research program second in size only to the federal EPA.

In addition to integrated work at the state and local levels, federal support is essential in resolving regional problems such as acid rain, or participating in international efforts to curb global problems with carbon dioxide pollution or ozone depletion. Energy, manufacturing, and transportation industries also need to play a vital role in funding research, monitoring, and pollution reduction programs.

Barriers to greater progress in air pollution reduction are political, technical, and economic. Reduced funding, reluctance of industry to take responsibility for pollution, the need for more research, and political paralysis, all contribute to programs that are partially successful at best.

Currently:

- thirty-two states have deficient implementation plans (SIPs) in one or more counties;
- EPA has imposed sanctions on twenty-one states as a consequence of SIP deficiencies;
- six states have passed legislation addressing acid rain control (no federal acid rain law has been passed);
- twenty-nine states are conducting acid rain research;
- twenty states have initiated regulatory programs in the newly emerging field of toxic air pollutants;
- as of July 1985:
  - thirty-seven states exceeded the primary standard for CO
  - two states exeeded the primary standard for NOx
  - eighteen states exceeded the primary standard for SO2
  - thirty-five states exceeded the primary standard for O3
  - thirty-four states exceeded the primary standard for TSP

SOIL CONSERVATION

. . . Ultimately, the solution may be tied to the changing nature of farms and agricultural economies.

The topsoil lifts off in fine brown clouds in the counties along the Iowa-Nebraska border. More than fourteen tons per acre are taken by the wind and rain every year. Along with part of the Texas Panhandle and the borderlands of Nevada, Arizona and southern California, this area has the heaviest erosion of anywhere in the country.

Rill erosion—primarily from water damage— and sheet erosion from water and wind vary widely from region to region. On average, cropland in the United States loses 4.4 tons per acre annually. In simple dollar amounts, the production problems caused by this erosion are estimated to cost $2 billion annually. Runoff carrying pesticides, herbicides and sediment into water supplies pushes estimates of erosion-related damage to $13 billion.[7]

Beyond the battering of drought and floods and wind, the methods and technology used in farming have much to do with the rates of soil loss. And added to these forces, cropland is also stripped by political and economic storms.

Some of the worst erosion in the nation's history came with a prolonged drought in the 1930s. More than a decade earlier, an increased demand for grain during World War One had accelerated the rate at which virgin grassy plains were ploughed under. Drought and dust had been a problem even for the pioneers who had begun farming the Great Plains with new steel plows in the 1860s. But the impact with which the 1930s drought hit ploughed grasslands was without precedent.

In May 1934 the worst storms hit carrying vast clouds of dust from the prairie. It buried farm buildings, crops, and pasture land. Huge clouds of dust were reported to have darkened the sun in Washington, D.C., sifted through the screens of office buildings in New York, and drifted for hundreds of miles out over the Atlantic.

Within a year, the federal government created the Soil Conservation Service to augment work already being done by the Civilian Conservation Corps and the fledgling Soil Erosion Service. In 1936 the Soil Conservation Service began to set up individual conservation agencies in each state and began to work directly with local farmers.

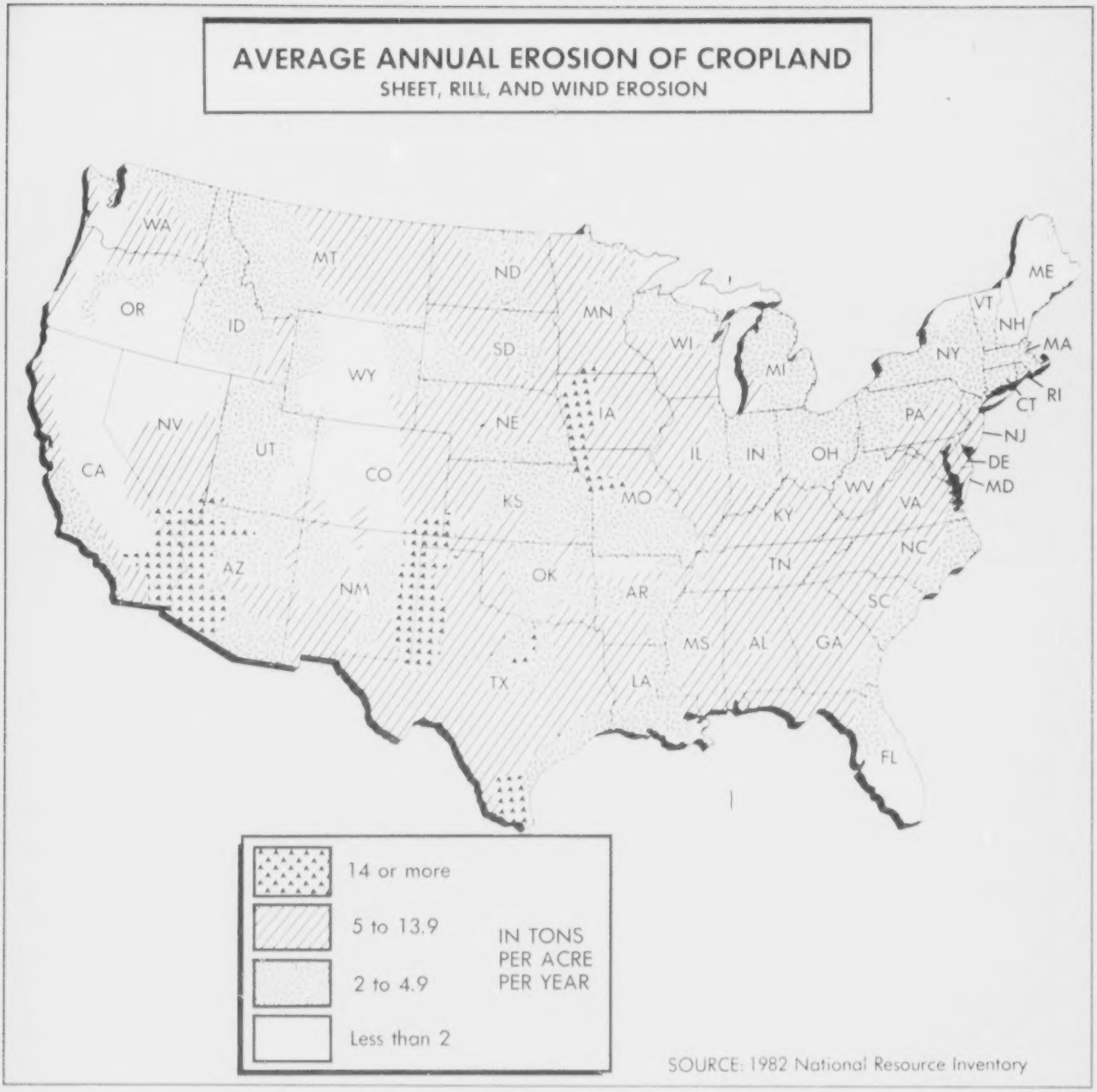
Steady progress was made in soil conservation until the early 1970s. Then, in order to meet increasing demands on the export market, a grain deal with the Russians, and food demands caused by drought in other parts of the world, Agriculture Secretary Earl Butz urged farmers to plant "fencerow to fencerow."[8] Just as the steel plow had helped break up the Great Plains, large new tractors with increased power made it easier to cultivate highly erodible rangelands and sandy hillsides. To accommodate the larger tractors, the size of fields increased and windbreaks and fallow strips between fields disappeared.

The amount of highly erodible soil under cultivation increased, and heavy soil loss became concentrated. In 1977 it was estimated that 25 million acres (six percent of the total cropland) was eroding in excess of 15 tons per acre. This land accounted for almost half of the total tonnage of cropland sheet and rill erosion.[9]

Today, a total of about 118 million acres of some 345 million acres of land classified as highly erodible are being cropped. According to the most recent surveys, the amount of cropland needing erosion control has been increasing in 26 states since 1977.[10] In targeting this erosion problem one of the chief questions which has arisen is whether participation in soil conservation programs should be voluntary or required by law.

In response to its major erosion problem, Iowa has developed one of the nation's best soil conservation programs. Unlike the voluntary programs in most states, Iowa has undertaken programs which regulate farming and land-use practices. It's a basic carrot and stick program. On the stick side, Iowa is the only state combining erosion and sediment control laws with soil loss limits and a penalty program. For the carrot—the state was the first to develop a cost-sharing program for soil and water conservation. Voluntary agreements to install and maintain approved conservation practices for 20 years are cost-shared 50/50 between farmers and the Soil Conservation District. Mandatory conservation practices adopted to comply with erosion control laws are cost-shared up to 75 percent.

In 1985 Iowa's state and local governments contributed more than $14 million to soil conservation. And of the 69 percent of the state's cropland needing conservation tillage—methods



such as reduced plowing and leaving crop residues on the field—51 percent was cultivated with these practices.[11] But like other areas, Iowa faces an on-going test to limit erosion and save more land, water and crops.

The presence of regulatory laws is sometimes enough of an incentive to assure conservation measures. In Vernon County, Wisconsin, an ordinance was passed in the mid-1970s that allows local residents to file a complaint if land is being mismanaged. Although courts can levy a fine of up to $200 per day if a farmer fails to comply with court-ordered conservation practices, peer pressure has reportedly sufficed in correcting problems.[12]

In Illinois, the state government and Soil Conservation Service have developed a program working through 98 conservation districts. Like Iowa's program, it includes soil loss limits, penalty actions, and cost-sharing. But in place of state erosion and sediment control statutes and a requirement for approved land-use plans, Illinois officials have targeted a voluntary goal of "T" by the year 2000. This means reaching acceptable tolerance limits for erosion in 15 years.[13]

Through the 1985 farm bill the federal government has also recently launched new voluntary and regulatory programs to reduce farming of highly

SOIL CONSERVATION MATRIX

	STATEWIDE CONSERVATION PROGRAM	EROSION AND SEDIMENT CONTROL LAWS[1]	ESTABLISHED SOIL LOSS LIMITS	APPROVED PLAN REQUIRED BEFORE SOIL CAN BE DISTURBED	PROVISIONS FOR ENFORCEMENT AND PENALTIES	COST-SHARING FOR SOIL CONSERVATION	AVG. TONS LOST (SHEET & RILL) PER ACRE ON TOTAL CROPLAND 1982	PERCENTAGE OF CROPLAND NEEDING EROSION CONTROL	PERCENTAGE OF TOTAL CULTIVATED ACRES IN CONSERVATION TILLAGE 1982	FUNDS APPROPRIATED BY STATE & LOCAL GOV. FOR SOIL CONS. PROGRAMS 1985[2]
AL	•					•	7.1	63%	23%	2,290
AK	•						ND	ND*	20	733
AZ	•						0.5	15*	5	4,920
AR	•					•	4.9	45	12	3,619
CA	•						1.2	11*	3	7,997
CO	•	•		•			2.2	68*	36	627
CT	•	•		•		•	2.8	27	15	2,267
DE	•	•		•	E	•	2.0	17	77	5,748
FL	•				E		2.0	36*	8	3,223
GA	•	•		•			6.4	63*	23	5,266
HI	•	•					6.4	41*	1	2,125
ID	•					•	5.0	58*	24	518
IL	•		•		E,P,	•	7.0	43	33	14,764
IN	•						5.5	43*	41	3,991
IA	•	•	•	•	P	•	9.4	69*	51	14,227
KS	•					•	2.7	51*	51	4,484
KY	•						9.5	46	54	5,591
LA	•						4.6	40	5	3,965
ME	•	•		•		•	2.1	35	18	1,223
MD	•	•		•	E	•	5.0	46	69	5,515
MA	•						2.1	19	5	5,047
MI	•	•		•	E		2.6	36*	26	2,549
MN	•		•			•	2.5	55*	22	16,293
MS	•					•	7.5	42	15	1,141
MO	•					•	9.8	52	39	19,020
MT	•			•		•	1.6	61*		2,582
NE	•					•	5.2	34*		20,305
NV	•	•			E		0.1	5*	44	110
NH	•	•		•			1.2	40*	14	253
NJ	•	•				•	1.3	55*	29	2,757
NM	•						1.3	43*	38	645
NY	•	•		•			3.0	31	12	19,590
NC	•	•		•	E	•	6.8	45	29	6,997
ND	•						1.9	50*	23	2,096
OH	•	•	•	•	E	•	3.7	34*	37	11,374
OK	•	•				•	2.2	42	30	5,907
OR	•						4.0	53*	29	3,744
PA	•	•		•	E	•	5.3	53	43	1,201
RI	•						2.5	36*	8	80
SC	•	•		•		•	3.6	27	9	3,715
SD	•	•	•	•	E	•	2.6	40	35	1,221
TN	•						10.0	54	24	1,736
TX	•						2.6	55*	16	10,284
UT	•					•	0.8	21*	16	25,128
VT	•					•	1.3	12	5	280
VA	•	•		•	E	•	6.2	43	55	4,383
WA	•						4.5	69*	30	1,152
WV	•						2.6	19	47	3,085
WI	•	•	•	•		•	4.5	46	23	12,132
WY	•						1.0	20	13	421

(for more extensive information see Soil Conservation Matrix Packet)
(see notes on page 33)

* increased since 1977

erodible land. One voluntary program allows for a "conservation reserve" into which farmers can place highly erodible land for a period of 15 years in return for federal subsidies. Another provision establishes "sodbuster" regulations to discourage new cultivation on highly erodible land. Farmers producing crops on highly erodible land have until 1995 to put conservation plans into effect. Beyond that time they will lose USDA assistance for crops on any of their land. Farmers who attempt to farm virgin land without following a locally approved conservation plan will also be disqualified from receiving USDA benefits.

The most popular method of reducing erosion and keeping land in production is conservation tillage. The term refers to a variety of means that eliminate the use of the moldboard plow and leave some crop residues on the soil after harvest. Most conservation tillage methods also depend primarily on herbicides for weed control.

Critics argue that conservation tillage increases the threat of groundwater contamination. They advocate organic farming methods—legume-based crop rotations, biological pest control, cover crops, and shallow tillage— to reduce both erosion and minimize use of pesticides and herbicides. For farmers accustomed to conventional farm production, a shift to organic farming represents a change filled with uncertainties for meeting current debts and production levels. It seems to go against popular wisdom that using organic methods of production and reducing cost inputs will bring about increased profits.

Another problem for conventional farmers is that even with cost-sharing, many who need erosion control most can't afford to have the work done. Some are caught on a desperate treadmill. Because of high debt-to-income ratios they lack funds to experiment with organic farming or conservation tillage and can't seem to make a transition, thus costs and debt remain high. On top of this, some farmers doubt that federal government will follow through with the policies and assistance programs it has outlined.

The answer for soil conservation is tied to many factors. The 1985 farm bill is seen by many observers as a step in the right direction— setting up a long term cropland reserve program for highly erodible land and reducing the production-oriented aspects of USDA's technical and financial assistance. Nearly nine million acres of highly erodible land were placed in the conservation reserve during the first year. But significant difficulty may lie in future funding for the program and for assistance in formulating required conservation plans. The Soil Conservation Service received $312 million in 1981 for conservation operations, $364 million in 1985, and $348 million in 1986. According to SCS officials nearly 500 staff people have been terminated because of budget reductions. To meet the farm bill provisions, they say, would take all 5,400 field staffers, who would have to ignore other obligations and still the deadlines would not be met.[14]

Ultimately, the solution may be tied to the changing nature of farms and agricultural economics—whether the future trend will be toward large mechanized farms or smaller, more intensive organic farms. It depends as well on how land is seen for short or long term production value. States and the soil conservation districts will play an important role in developing both regulatory and voluntary programs. But beyond plans set in motion by government, the extent and success of soil conservation will ultimately be decided by economic pressures and the commitment of those farming the land.

SOIL SNAPSHOT

Iowa represents the best state program in soil conservation with policies that combine soil loss limits with land-use planning requirements. It also offers cost-sharing with farmers for implementation of conservation measures. Long term progress in soil conservation may rely on more than government land-use policy, however. Beyond regulations, incentives to take highly erodible land out of production, and use of conservation tillage are organic farming practices— legume-based crop rotations, biological pest control, the planting of cover crops, and shallow tillage—which have been shown to save significantly greater amounts of soil.

To bring such practices and beneficial programs into wider use will require substantial educational work, low interest loan funds for farms in transition, stable federal funding for soil conservation, and follow-through for programs such as the conservation reserve.

Currently:

- state and local cost-sharing and other financial incentive programs are in place in twenty-six states;
- twenty-one states have adopted a specific law for soil erosion and sedimentation control;
- eleven states have provisions for enforcement of state erosion and sediment control laws;
- an approved land-use plan is required before land can be disturbed in nineteen states;
- two states have state-enforced penalty provisions.
- six states have established soil loss limits.

SOLID WASTE & RECYCLING

. . . Local solutions will not work without federal and state support.

More than half the cities in America will exhaust their current landfills by 1990. Already, rising mountains of trash overwhelm the sites of once self-contained town dumps, and thousands of dumps have been closed for pollution problems. Managing our growing volume of trash is one of the most urgent and fundamental environmental problems local officials face. Strategies that states and the federal government encourage, and the choices made by local communities will determine important tradeoffs in threats to groundwater, air pollution, the generation of energy, and the consumption of raw materials.

Americans produce 150 million tons of municipal trash each year—nearly 3.5 pounds per person per day. According to Franklin Associates, 37 percent of this residential and commercial waste is paper. Another 18 percent is yard waste, 8 percent is food waste, 10 percent is glass, 10 percent is metals, 7 percent is plastic, and the remainder is wood, rubber, textiles and miscellaneous inorganics. Currently about 8 percent of municipal trash is recycled, 5 percent is incinerated, and 87 percent is disposed of in landfills.[15]

Industry produces an additional amount of waste estimated to be as much as 350 million tons per year. Most industrial wastes are dumped in private landfills that are unregulated and unmonitored.[16]

The burgeoning solid waste problem reflects a trend in lifestyles and marketing of goods that emphasize shopping convenience, quick preparation and consumption, and easy disposal. Since 1960 the amount of waste generated by packaging has increased more than 200 percent (24 million tons in 1960 to 75 million tons in 1985). And the types of packaging include more mixed materials which are difficult if not impossible to recycle. Despite the growth in the volume of packaging, and in population, until recently there was only a sluggish response to warning signals of a mounting trash crisis.

The first signals came in the early 1960s when increasing volumes of trash and unregulated dumping raised concerns about serious health and environmental threats. In response, Congress passed the Solid Waste Disposal Act of 1965. The act provided assistance to states undertaking research, surveys, and innovative solutions for waste management. Five years later, uncontrolled dumping was still the norm. Congress then passed the Resource Recovery Act of 1970 to promote state action. Additional funds for research and construction of advanced design landfills were provided and the federal government kept an advisory role. Most significantly, the act officially identified recycling as an economical and efficient means of reducing and managing waste for the first time.

Work carried out under the 1970 law helped to reveal not only the extent of uncontrolled dumping of solid waste, but also the risk involved with the dumping of hazardous, or toxic wastes. A few years later, in 1976, Congress passed the Resource Conservation and Recovery Act to address the growing complexity of waste management problems. To trace the dumping of hazardous waste the law set "cradle to grave" regulations. Nearly 200,000 surface impoundments—pits, ponds, and lagoons containing industrial, agricultural, and muncipal liquid wastes—were also covered by the law. And most importantly for solid waste, the law encouraged states to develop solid waste management plans and established minimum siting and operating standards for disposal facilities.[17]

As of October 1985, twenty-two states had solid waste management plans fully approved by EPA. But federal assistance and funding originally promised were not available. Federal funding under the solid waste Subtitle D program was cut from $13 million in 1981 to $0 in 1986. Because of federal funding cutbacks, no states received grants for solid waste management after 1981.[18] Nevertheless, while many states made little progress in solid waste management, several individual states, cities, and counties have pushed ahead.

Minnesota had taken an early lead in solid waste management by passing the Excess Packaging Act in 1973. The law was intended to reduce the volume of packaging of goods and to limit packaging to types which could be recycled. Courts upheld the statute but strong opposition from the packaging and bottling industry kept it from being implemented. In 1980 the state passed the Waste Management Act, a law often referred to as "planned agitation" because it forced counties to choose future landfill sites at the same time

tests revealed contamination of groundwater. Alarmed by threats of groundwater contamination, citizens took a strong role in public meetings and advisory boards. Using the state mandate to emphasize recycling and waste reduction, they settled on strategies that utilize a variety of source separation, waste reduction, composting, incineration and minimal disposal in landfills.

New Jersey has seen a similar "agitation." Threats of widespread pollution forced closure of 217 of the state's 310 landfills between 1977 and 1985. Thirty of the closed landfills, which like many landfills contained significant amounts of toxic waste, were placed on the Superfund National Priority List or put under enforcement and cleanup actions by the state. The state's Solid Waste Management Act, passed in 1976, set up 22 solid waste districts charged with developing ten year plans for waste disposal. The law also encouraged development of waste-to-energy incineration plants and a subsequent law passed in 1981 targeted 25 percent recycling for New Jersey counties.[19]

SOLID WASTE MATRIX

	SOLID WASTE MANAGEMENT PLAN 1-5	REGULATIONS FOR LANDFILL SAFETY AND CONTROL 1-5[a]	RECYCLING PROGRAM 1-5	TOTAL MONITORING OF GROUNDWATER	TOTAL INSPECTIONS[b]	FREQUENCY OF INSPECTIONS	NUMBER OF GROUNDWATER VIOLATIONS	NUMBER OF SUBTITLE D LANDFILLS	NUMBER OF SUBTITLE D SURFACE IMPOUNDMENTS	ESTIMATED SOLID WASTE TONNAGE tons/day[c]
AL	1	3	4	134	730	twice/yr	30	800	3,725	6,983
AK	5	3	3	20	550	<once/2 yrs	7	740	1,061	875
AZ	1	4	4	7	142	once/yr	5	185	586	5,343
AR	1	4	3	21	254	twice/yr	7	116	25,705	4,111
CA	1	1	2	265	2,467	once/yr	24	720	—	44,839
CO	3	2	4	36	42	twice/yr	16	130	6,385	5,562
CT	1	1	2	115	263	twice/yr	87	188	142	5,520
DE	2	3	3	12	58	once/yr	6	37	42	1,073
FL	1	1	3	174	738	twice/yr	76	238	2,126	19,208
GA	1	3	4	26	710	once/yr	3	390	513	10,215
HI	4	4	3	1	106	>4x/yr		25	243	1,818
ID	3	3	4	8	361	twice/yr	6	126	228	1,752
IL	1	3	2	246	744	once/yr	76	275	5,157	20,144
IN	1	3	3	70	1,572	>4x/yr	8	131	1,191	9,622
IA	1	2	2	88	432	—	—	102	877	5,093
KS	3	1	4	42	963	twice/yr		463	7,873	4,267
KY	1	1	2	92	1,468	>4x/yr	—	181	—	6,515
LA	1	3	4	—	—	—	—	6.8	20,010	7,809
ME	3	1	3	61	475	twice/yr	115	362	292	2,023
MD	4	3	3	63	—	>4x/yr	1	16	770	7,611
MA	1	3	2	43	87	once/yr	136	249	630	10,147
MI	1	2	1	99	780	4x/yr	203	257	636	15,881
MN	1	1	1	124	850	>4x/yr	103	160	3,233	7,284
MS	1	3	4	6	481	4x/yr		195	2,112	4,547
MO	3	—	4	—	—	—	—	138	—	8,764
MT	3	4	4	20	240	twice/yr		170	330	1,442
NE	2	1	2	20	45	once/yr	4	413	2,115	2,811
NV	4	3	4	0	46	once/yr		117	529	1,594
NH	3	3	3	33	421	4x/yr	52	125	189	1,710
NJ	4	1	1	98	604	>4x/yr	30	108	985	13,151
NM	5	4	4	1	409	twice/yr	4	214	17,044	2,492
NY	4	1	1	99	1,110	once/yr	315	522	583	31,036
NC	1	2	3	79	85	once/2 yrs	1	243	815	10,789
ND	2	3	4	18	573	twice/yr		139	894	1,201
OH	1	3	2	53	—	4x/yr	12	211	7,227	18,816
OK	1	1	3	107	677	twice/yr	13	173	7,260	5,772
OR	2	3	1	20	300	once/yr	4	220	270	4,680
PA	1	4	1	195	2,120	>4x/yr	67	1,204	32,653	20,827
RI	3	3	3	13	156	other	8	13	55	1,684
SC	4	4	3	0	1,558	4x/yr	124	286	1,680	5,775
SD	3	4	4	10	410	4x/yr	12	357	350	1,236
TN	1	3	3	70	930	4x/yr	23	166	5,665	8,525
TX	1	1	4	93	—	once/yr	27	1,201	7,733	27,981
UT	4	—	4	—	—	—	—	375	—	2,891
VT	3	4	3	77	490	>4x/yr		101	—	928
VA	4	4	3	92	1,064	4x/yr	52	264	1,600	9,863
WA	2	4	2	25	26	<once/2 yrs	69	260	750	7,611
WV	4	4	3	31	730	once/yr	8	1,209	18,705	3,416
WI	2	2	1	148	2,005	once/yr	48	1,033	4,084	8,341
WY	4	4	4	99	307	once/yr	7	300	—	894

(for more extensive information see Solid Waste Matrix Packet)
(see notes on page 33)

Despite these laws, which have created some of the most comprehensive solid waste programs in the nation, New Jersey still expects a shortfall of solid waste capacity between 1991 and 2000. Environmentalists and community planners critical of the high costs and toxic wastes generated by incineration plants claim more recycling and composting are needed. Alternative solid waste managment advocates claim that ultimate solutions for waste problems lie in reducing waste by 5-10 percent, recycling 50 percent of the waste stream, composting 25-30 percent, and landfilling the remaining 10-30 percent.[20]

Several communities are testing the possibilities of such systems. Berkeley, California has launched a plan to recycle 50 percent of its wastes by 1991. Camden County, New Jersey is targeting 35 percent of its waste stream for recycling. And the city of East St. Louis is embarking on a major recycling program centered on a 2400 ton per day preprocessing plant which sorts out recyclable materials and leaves a minimal amount to be incinerated or disposed of in landfills.

The outcome of these strategies may influence the options other communities will have in the future for less costly and more benign solid waste disposal. But these local solutions will not work without federal and state support in marketing recycled goods and in helping finance pilot projects. Long term solutions will also require policymaking that will encourage the reduction of waste by the packaging and bottling industries.

SOLID WASTE SNAPSHOT

The best working model for solid waste management programs and policies is New Jersey. Despite a heavy reliance on construction of incineration plants, New Jersey is the first state to target 25 percent recycling for its counties, and require ten year plans from its 22 waste districts. The state also conducts frequent inspections and substantial monitoring for groundwater contamination at landfill sites.

Alternative waste management advocates claim that landfilling and incineration can be minimized by programs which encourage 5-10 percent waste reduction, recycling 50 percent of the waste stream, and 25-30 composting.

Currently:

- despite a decade of legislative activity only three states have mandated waste reduction;
- nine states have passed "bottle bill" legislation to encourage recycling of bottles;
- nine states offer tax breaks on recycling equipment, and five states are doing research into uses of recycled materials;
- twenty-two states have EPA-approved solid waste management plans;
- six states have partial approval from EPA for solid waste management plans;
- ten states have adopted plans and have submitted them to EPA for review;
- two states have submitted no waste management plans.

HAZARDOUS WASTE

. . . It will take more than $100 billion dollars and decades to clean up the worst 10,000 sites.

In 1978 the residents of Love Canal brought national attention to the tragedy of leaking hazardous waste dumps. After door-to-door organizing and public protests, government researchers confirmed the clustering of birth defects, miscarriages, cancer, and health problems that plagued the neighborhood. The source was toxic chemicals dumped and buried beneath the neighborhood decades earlier.

Since that time the Environmental Protection Agency has targeted 22,000 hazardous waste sites across the country for attention. Some government officials believe that this only scratches the surface of the problem. Researchers at the federal Office of Technology Assessment put the total number of contaminated sites at 600,000.[21]

While the tragedy at Love Canal, and those at Times Beach, Missouri and the Stringfellow Acid Pits near Glen Avon, California have become familiar stories, what is not well known is that it will take more than $100 billion dollars and decades to clean up the worst 10,000 sites.[22] In the meantime, many sites are likely to see emergency cleanup work, plastic caps and containment walls, in an attempt to minimize the damage. And beyond the long term work of cleaning up the sites, a more fundamental problem lies in efforts to reduce the volume of hazardous waste still being produced.

The generation of significant amounts of hazardous waste largely coincides with the growth of the chemical industry. From 1945 to 1970, the production of synthetic organic chemicals increased tenfold. Today, the chemical and manufacturing industries generate about 260 million tons of hazardous waste each year in the United States—one ton for every man, woman, and child.[23] Several federal studies including the most recent Environmental Protection Agency study and a 1983 Congressional Budget Office study cite Ohio, Illinois, California, Pennsylvania, New Jersey, New York, and Michigan as producing the largest volumes of hazardous waste.[24] About 90 percent of the waste is in liquid form—water from chemical processes and cooling systems laden with toxic compounds and heavy metals. Until a decade ago the primary solution for disposal was to bury 50 gallon drums of waste in landfills, or to dump it into pits, lagoons, or wells. As public awareness of the danger of toxic chemicals spread, new laws were passed by Congress to control their use and disposal

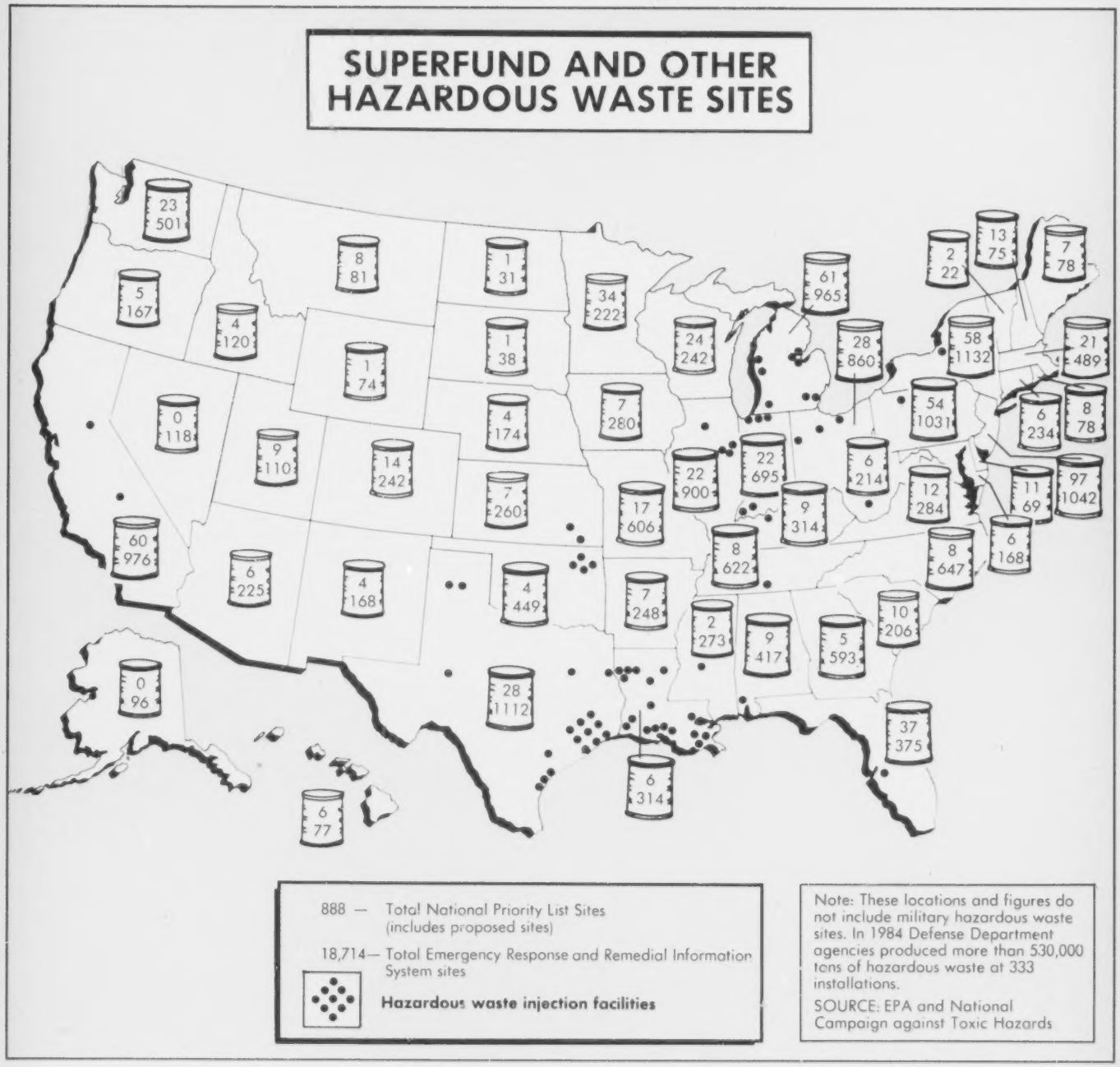
In 1976, when Congress passed the Resource Conservation and Recovery Act to address growing problems with disposal of both solid and hazardous waste, it also passed the Toxic Substances Control Act. TSCA was intended to regulate toxic chemicals throughout their manufacture, use and disposal cycles. Monitoring and research under these laws help to reveal the extent of hazardous waste contamination the nation faced.

In 1980, Congress passed the Comprehensive Environmental Response, Compensation and Liability Act—Superfund. While the 1976 laws attempted to prevent pollution, Superfund targeted action to be undertaken once pollution was found. The five-year $1.6 billion project was to identify the worst hazardous waste sites and design and initiate remedial action.

State governments were given an important role in Superfund cleanups. In many cases EPA set up cooperative arrangements with states. Superfund would provide money, and a state agency would develop a workplan, schedule and budget, and oversee cleanup work. In other cases EPA took the lead and the state maintained an advisory role. Major problems arose due to the large number of sites identified and insufficient funding. But more troubling was a lack of technology, experience, and training for adequate cleanup even where substantial funding was made available. Another problem was getting companies responsible for the contamination to accept liability and share in the costs. The policy of the Reagan administration was to litigate and negotiate settlements with companies, a process which stalled cleanup further.

From 1981 to 1986, only 13 sites were removed from the national priority list and remedial action was undertaken at 500 sites.[25] For 90 percent of the sites on the list, no long term action was begun in the first five years of the program. There was clearly not enough money or commitment.

EPA estimated that it would cost an average of $8.8 million to clean up a site on the national priorities list, and another $4 million to operate and maintain it. Out of 812 sites on the list in 1984, 64 percent were scheduled to receive $500,000 or less, and 10 percent



would receive $2 million or more.[26]

In response to the lethargy of the federal program and the lack of federal funds to clean up sites needing attention, 29 states implemented their own Superfund laws and provisions. In Massachusetts, the state legislature passed the "Massachusetts Oil and Hazardous Materials Release Prevention and Response Act" in 1983. As a counterpart to the federal Superfund program, it targeted cleanup of the 489 sites in the state not on EPA's national priority list. The law allows preventive actions and assessements as well as containment and cleanup. Individuals responsible for a release, or threat of release, for which the state incurs cleanup costs are strictly liable for up to three times the state's costs. The law also set up a $25 million fund for cleanups.[27]

The Massachusetts statute was modeled on similar laws in New York, California, and New Jersey. New York has approved a $1.2 billion fund for toxic cleanup at 500 sites. And New Jersey, which is acknowledged to have the most extensive hazardous materials policies, is expanding its $100 million

HAZARDOUS WASTE MATRIX

	STATE SUPERFUND STATUTES[1]	SMALL QUANTITY GENERATOR REGULATIONS[2]	UNDERGROUND INJECTION RESTRICTIONS	PRE-HSWA FINAL AUTHORIZATION[3]	COMMUNITY RIGHT TO KNOW[4]	INCENTIVES TO REDUCE/RECYCLE[5]	HOUSEHOLD HAZARDOUS WASTE COLLECTION[6]	NUMBER OF NATIONAL PRIORITY LIST (NPL) SITES	NUMBER OF ERRIS LIST SITES[7]	RANKING BY HAZARDOUS WASTE GENERATION[8]
AL			•			•		10	475	23
AK					•		S	0	108	46
AZ	•		•	•				9	251	39
AR	•			•				8	277	31
CA	•	•	•		•	•	C/L	61	1,622	4
CO				•				15	323	32
CT			•			•	S	7	294	21
DE				•	•			14	136	29
FL	•		•	•		•	S	39	801	17
GA				•		•		5	675	20
HI						•		6	85	48
ID								4	140	36
IL	•			•		•		25	1,068	3
IN	•			•		•		28	865	10
IA	•				•	•		13	337	27
KS	•	•	•	•		•		7	284	28
KY	•			•		•		10	383	22
LA	•	•	•	•	•			7	343	14
ME	•	•				•		21	96	37
MD	•	•		•	•	•		8	233	24
MA	•	•	•	•	•	•	C/L	7	628	16
MI	•	•			•	•	S	66	1,447	8
MN	•	•		•		•	S	38	304	25
MS				•		•		2	298	30
MO	•			•	•	•		17	867	13
MT				•	•			9	130	43
NE				•				5	204	38
NV				•				0	122	45
NH	•	•		•	•	•	S	13	119	40
NJ	•			•	•	•		97	1,238	1
NM	•			•			C/L	4	187	42
NY	•			•		•	C/L	65	1,242	7
NC				•	•	•		8	706	11
ND				•				1	36	49
OH	•					•	S	30	927	2
OK			•	•		•		5	503	33
OR	•			•	•	•	C/L	5	197	34
PA	•			•	•	•		65	1,908	5
RI		•		•	•	•	S	8	184	35
SC	•			•		•		12	310	15
SD				•				1	44	50
TN	•		•	•	•	•		8	689	9
TX	•			•	•			26	1,879	6
UT				•				10	149	41
VT	•	•		•	•		S	2	60	44
VA				•			C/L	13	376	12
WA	•			•	•		C/L	28	542	26
WV		•		•	•	•		6	278	19
WI	•	•		•		•	S	30	318	18
WY								1	87	51

(for more extensive information see Hazardous Waste Management Appendix Packet)
(see notes on page 34)

fund to $200 million.

The states will get a boost in support from the $8.5 billion dollar Superfund finally reauthorized in September 1986. Most importantly, the new five-year program will provide long-term cleanup funding previously expected to be bourne by the states; will set basic requirements for how clean a site must ultimately be; and include community-right-to-know provisions. These elements will generally encourage state and citizen involvement in cleanup.

But even as cleanup programs have raised new hope of moving ahead, shutdown of hazardous waste landfills and the continued production of more than 260 million tons of hazardous waste each year is creating new pressures. More than 60 percent of the hazardous waste now being produced is disposed of in "underground injection" facilities which use former oil wells or underground caverns to contain a variety of liquid hazardous wastes. Significant controversy has come to surround these sites and at least ten states have passed laws restricting their use.

The primary solution being urged is reduction of hazardous waste production through use of substitute chemicals, neutralization of hazardous chemicals on site, or recycling of waste. Because of the low cost of land disposal and underground injection, only 12 percent of the waste being generated is disposed of with state-of-the-art technology.[28] Greater use of recycling and neutralization of wastes will require incentives for industry. Another element that may force the issue is the emergence of community right-to-know laws which allow citizens access to information on what hazardous materials are being used or stored in their community. Twenty-one states have passed some form of this law. But generally, a difficult and costly period of transition for state government and industry lies ahead with great gains needing to be made in waste minimization and cleanup technology.

HAZARDOUS WASTE SNAPSHOT

Like solid waste management, the best working model for hazardous waste programs and policies is New Jersey. The most essential part of a state's policies are those which address reduction of hazardous waste generated by industry. Also important are laws that encourage: recycling of hazardous materials, household hazardous waste collection programs, small quantity generator regulations, and restrictions on underground injection. Citizen ability to take part in waste regulation through "right-to-know" laws are also vital. And the formulation of a comprehensive state Superfund to oversee cleanup of sites outside the scope of the federal Superfund is essential to protection of public health.

To create such programs and policies on a broad scale will take increasing cooperation between state and local government and industries that handle, store, generate, or dispose of hazardous materials.

Currently:

- thirty-one states have passed legislation on leaking underground storage tanks, and thirteen have regulations in place;
- household hazardous waste collection programs have taken place in seventeen states on a county, state, or local level,
- restrictions on underground injection of hazardous waste has been passed in ten states;
- thirteen states have regulations for small quantity generators more stringent than the federal Hazardous and Solid Waste Amendments (HSWA) that took effect September 22, 1986;
- thirty-nine states had received final EPA approval for the pre-HSWA program as of May 15, 1986;
- twenty-nine states have superfund statutes—(which at a minimum authorize the state to conduct a site assessment or force a responsible party to conduct an assessment).

GROUNDWATER PROTECTION

. . . Almost $110 billion will be needed through the year 2000 to meet the nation's clean water goals.

Groundwater, the nation's great hidden resource, is a domain infused with popular myths. Once it was believed that water purified itself as it passed through sandy soil. It was also thought that water moved so slowly underground that contamination spread at a snail's pace, if at all. Evidence uncovered in the past decade has begun to turn such myths around.

In 1976, groundwater monitoring at a 130 acre hazardous waste landfill in the town of Wilsonville, Illinois revealed contaminants migrating at a rate 100 to 1,000 times faster than predicted. Scientists were surprised. The site had a clay liner and was believed to be one of the best in the state. Researchers later found a substantial difference between what lab experiments had indicated about water movement and what actually happened in the field. Their findings provided support for a ban on landfilling of hazardous waste in Illinois and raised questions about similar landfills all across the country.[29]

Wilsonville isn't a special case. Problems that surfaced at thousands of hazardous waste sites and municipal dumps have helped to create a surge of interest in protecting groundwater.

The nation's aquifers are contained in vast networks of underground rivers, streams, ponds, and immense lakes. It is a hidden resource of immense importance. Groundwater supplies drinking water for half of our population. The nation's agricultural system is dependent on it. And its quality has a direct effect on our health. In total, underground aquifers in the continental United States are estimated to contain 16 times as much water as the Great Lakes. But despite this gigantic total volume, many individual aquifers face serious threats of contamination, or depletion, or both.

It takes a daily leak of only a single gallon of gasoline, for example, to contaminate millions of gallons of water. A report issued by the U.S. Environmental Protection Agency in August 1986 indicates as many as 300,000 underground gasoline storage tanks are leaking into the subsoil. Another EPA document identifies 12,442 incidents of leaking underground gasoline storage tanks reported to state governments. In Maine, 190 different incidents of gasoline contamination were confirmed between 1979 and 1984. In Florida, there were 223 incidents of groundwater contamination from petroleum leaks as of January 1984. And in a number of towns drinking water supplies have been rendered unusable.[30]

Such problems have sparked 21 states to pass laws regulating underground storage tanks, but only 13 have formulated regulations for storage tank programs. In conjunction with the 1986 Superfund reauthorization the federal government has allocated $500 million for leaking underground storage tanks. Primary responsibility is being left to state and local government, however, and there is a "Catch 22" for states which may need the funding the most: If a state has not launched a program because of a lack of state funds it may be ineligible to receive federal funds. This could result in delays in locating contamination, causing both the extent of the contamination and ultimate cleanup costs to grow.

Groundwater supplies are also threatened by "nonpoint source" pollution—agricultural runoff from pesticides, herbicides, and salt leached from highways. In rural areas where 90 percent of the population is dependent on groundwater for drinking, heavy use of chemicals on the land over the past thirty years has resulted in steadily increasing contamination.

In Kansas, pesticides were detected in 11 percent of the wells tested in 1972. This rose to 72-78 percent of the same wells in 1983 and 1984. In Iowa, pesticide concentrations were found in 55 percent of the wells sampled in one study. In Nebraska, another study showed 70 percent of the wells tested to be contaminated. In some cases the problems were from pesticides or fertilizers which had originally been expected to decay rapidly and pose no danger to water supplies.[31]

The most tragic fact is that once groundwater has become contaminated it is difficult and costly, if not impossible, to clean up. Consequently, emphasis is now being placed on programs which gather more data, unravel the myths, and find ways to limit further contamination of aquifers.

Innovative and urgent work is being undertaken by both private organizations and state governments. In Michigan, for example, more than 1,000 incidents of groundwater contamination are currently identified. The state

GROUNDWATER WITHDRAWALS

SOURCE:
U.S. Geological Survey, 1984

Department of Natural Resources estimates that as many as 50,000 sites in the state could experience contamination. The cleanup costs are estimated to exceed $3 billion. The Science for Citizens Center at Western Michigan University has launched a program to map the aquifers in 17 counties that make up about one quarter of the state. The three dimensional computer map generated by the project will show both the volume and the flow of area aquifers. It will provide a vital tool for land use planning decisions. And the mapping program could become a much needed model for the state, helping to limit or prevent contamination from the 50,000 potential problem sites.[32]

To address the problem of groundwater contamination most states need technical assistance, as well as funding and models for research. The U.S. Geological Survey has recently mapped major aquifer systems and in 1984 EPA began efforts to support development of state groundwater strategy plans. Twenty-eight states currently have groundwater strategy management

GROUNDWATER MATRIX

	LEGISLATIVE AUTHORITY TO IMPLEMENT STRATEGY MNGT.[1] PLAN	GROUNDWATER STRATEGY MNGT. PLAN IN PLACE	GROUNDWATER QUALITY STAND. IN PLACE	STRATEGY PLAN INCLUDES MAPPING	LEAKING UNDERGROUND STORAGE TANK LEGISLATION[2]	NON-DEGREDATION OR LIMITED DEGREDATION AS STATE POLICY[3]	MONITORING FOR PESTICIDES, SALT WATER INTRUSION, HAZ. WASTE, NON-HAZ. WASTE[4]	STATE POLICY FOR CONTROLLED LAND USE AREAS	PERCENTAGE OF POPULATION SERVED BY GROUNDWATER	GROUNDWATER WITHDRAWAL PER DAY (MGAL)[5]
AL							NH,SW,HW		52%	290
AK			•				P		69	49
AZ	•	•					P,HW,NH	•	65	4,200
AR							HW		50	4,300
CA	•			•	•	N	P,HW		46	14,600
CO	•	•			•			•	15	2,800
CT	•	•	•	•	•		P,HW,NH		32	150
DE	•	•		•	•		P,HW,NH		60	82
FL	•	•	•		•		P,SW,NH	•	90	3,800
GA	•	•		•		N	P,SW,HW,NH		48	1,200
HI		•		•			P	•	95	710
ID	•	•		•			P,HW,NH	•	88	6,300
IL	•	•	•	•			HW		49	980
IN	•	•		•			HW		32	1,200
IA	•				•	N	P	•	82	900
KS	•	•		•	•		P,SW,HW,NH	•	49	5,600
KY	•								31	180
LA					•		HW	•	69	1,800
ME	•	•		•	•	N	P,HW,NH		57	80
MD	•		•		•		HW,NH		30	175
MA	•	•	•	•			P,HW,NH		33	320
MI	•	•	•		•	N	HW,NH	•	43	530
MN	•		•				P,HW,NH	•	75	670
MS	•							•	93	1,500
MO	•		•	•		N	P,HW		34	470
MT			•			N	P	•	54	200
NE	•	•	•	•			NH	•	82	7,100
NV	•						HW,NH	•	50	710
NH			•		•	N	P,HW,NH		60	65
NJ	•	•	•	•			HW,SW,NH	•	45	730
NM	•	•	•	•		L	P,SW,HW,NH	•	89	1,800
NY	•	•	•	•	•	L	P,SW,HW,NH	•	35	970
NC	•	•	•	•	•		HW,SW,NH	•	55	770
ND	•			•			P,HW,NH		62	110
OH	•			•			HW,NH		42	740
OK	•	•		•	•		P		41	960
OR	•	•				L	P,HW,NH	•	61	1,100
PA	•			•		L	P,HW	•	44	1,000
RI	•	•		•		N	P,HW,NH		24	37
SC		•	•	•	•		P,SW,HW,NH	•	42	210
SD		•		•	•		P,HW,NH		77	330
TN		•	•	•			P		51	460
TX							P,SW,HW,NH	•	47	9,700
UT					•			•	63	772
VT		•			•		P,HW,NH		56	45
VA		•	•	•			P,SW,HW	•	46	370
WA	•			•			P,SW,HW,NH	•	71	750
WV				•			P,HW		53	220
WI	•		•		•	L	P,HW,NH		70	580
WY	•	•	•	•	•		NH	•	54	540

(for more extensive information see Groundwater Appendix Packet)
(see notes on page 34)

plans in place. And 29 states have indicated additional mapping as part of their plans. Land-use planning to protect aquifer recharge areas, such as wetlands, is one of the most essential elements of state policy. In general, state activities fall into a continuum with efforts to limit specific contamination at one end and comprehensive systems to address both contamination and availability of groundwater at the other. The most stringent policy, passed by nine states, mandates nondegradation of water quality. Five other states allow limited degradation, and the remainder have no formal policy.

The federal government helps states oversee groundwater protection with a patchwork of 16 federal laws. Federal soil erosion laws aim at reducing nonpoint source pollution of water supplies, for example, and the 1984 amendments to the Resource Conservation and Recovery Act require groundwater monitoring at hazardous waste and solid waste dumpsites. Currently, more than two dozen federal agencies and offices are responsible for some aspect of groundwater protection. According to EPA almost $110 billion will be needed through the year 2000 to meet the nation's clean water goals.[53] Unfortunately, federal aid is being sharply curtailed, leaving some question as to how the goals will be met.

Recognizing that a new groundwater project is not likely to receive federal funding, environmentalists are pressing for greater coordination of government programs. Support is now building for legislation to establish a national groundwater protection goal and an interagency task force to oversee progress toward the goal. There are three main options for the goal: a policy of non-degradation, maintaining water at its existing quality; protecting quality at some newly established standard; or accepting a need for sacrifice of some aquifers and distinguishing among them and setting levels of protection on each type.[54]

The debate in 1987 promises to be intense. And whatever the outcome, primary responsibility for implementing the national policy will fall to the states.

GROUNDWATER SNAPSHOT

The best state policies and programs to protect groundwater have been formulated by New York. As with many environmental problems, the most effective state groundwater programs combine establishment of local agencies and a statewide coordinating office. The organization operates under a statewide strategy and carries out mapping of aquifers; monitoring for pesticides, hazardous waste, salt water, and nonhazardous waste; tests for leaking underground storage tanks, and coordinates land-use policy with needs to protect aquifer recharge areas. A number of states have contained their commitment to groundwater protection in a policy of nondegradation of groundwater quality.

The most significant barriers for such programs and policies are the lack of funding, the lack of coordination between agencies, and the lack of detailed hydrological information for most areas.

Currently:

- nine states have adopted nondegradation as a state policy, and five states allow limited degradation;
- twenty-six states control land-use areas to reduce contamination threats to aquifers;
- twenty-one states have passed legislation on leaking underground storage tanks, and thirteen have regulations in place;
- twenty-nine states are conducting, or plan to conduct underground aquifer mapping;
- thirty-three states monitor for two or more pesticides;
- thirty-seven states monitor hazardous waste sites for groundwater contamination;
- twenty-eight states have a groundwater strategy/management plan in place.

RENEWABLE ENERGY & CONSERVATION

... The question is whether we need to suffer severe energy crises in order to change our policies.

Every major city and state government faces a quiet crisis over energy use. Even those which now enjoy a glut of electricity or natural gas, or relatively cheap oil, are approaching a period in which planning time and options will begin to close out. Officials at the US Department of Energy currently predict substantial increases in oil imports from the Middle East by the mid-1990s. They also point to the possibility of brownouts and blackouts unless construction of new generating plants is begun.[55] And despite the controversy over these predictions, and their implications for national security and the environment, everyone agrees that energy prices will inevitably rise and place growing pressure on local and regional economies. The question is whether we need to suffer severe energy crises in order to change our policies.

In the last decade, renewable energy and conservation (using energy more efficiently) have become the most promising solutions for avoiding new energy crises. Since 1974 more efficient use of energy has helped to diminish projected growth in energy demands for the year 2000 by half—and substantially reduced the need for oil imports and new power plants. Annual growth in electricity needs, for example, has dropped from seven percent per year to less than two percent per year.[56] Overall, the nation is about 24 percent more efficient in its energy use today than in 1973.

It's generally acknowledged that this energy efficiency is only scratching the surface of much greater potential. Energy efficient bulbs now on the market have the potential to save half the electricity now used for lighting. Variable drives on electric motors could save one third the electricity they consume. And energy efficient home appliances are projected to save half the electricity they now use. A 1983 Congressional Research Service study reported a cost effective conservation potential for 161,000 megawatts of electricity by 1990 and 214,000 megawatts by the year 2000—equal to more than 200 large nuclear plants.[57]

Renewable energy sources such as solar, wind, biomass, hydro, and geothermal also hold bright prospects. In 1979, the federal government estimated 20 percent of the nation's energy could come from renewable energy technologies by the year 2000. Today renewable energy sources supply 9.6 percent of total U.S. energy production.[58] The problem in doubling renewable energy supply in the next fifteen years—and increasing energy efficiency as well—is a lack of on-going political commitment.

Energy policy-making is largely crisis oriented. In response to the oil shocks of 1973 and 1979 Congress passed a half dozen laws to involve states in promoting energy efficiency.

The State Energy Conservation Program, put in place by Congress in the mid-1970s, encouraged states to set up state energy offices with a goal of reducing energy consumption in each state by 5 percent by 1980. Although the goal wasn't met, the state energy offices laid the basis for new energy planning through an array of projects and educational activities. The agencies also administered federal funds for several programs. One program was the Residential Conservation Service (RCS). From May 1981 to April 1984 RCS funds supported energy audits for three million homes. Another state-administered program was the Solar Energy and Energy Conservation Bank which offered grants and low interest loans to homeowners for solar and conservation improvements. As of 1985, 38 states had received more than $18 million with another $42 million obligated.

The federal government also stimulated energy efficiency by offering a "conservation tax credit" to homeowners. Between 1979 and 1984 more than 28 million taxpayers—representing about one third of all households in the United States—claimed the credit, saving an estimated 6.5 billion barrels of oil at a cost of less than $10 per barrel.

Similar tax credits were also offered for renewable energy equipment. To help build markets and attract investment capital, the Energy Tax Act of 1978 established an array of income tax credits for residential and commercial purchase of solar, wind, or other energy equipment. Following the federal lead, 24 states added income tax credits for purchase of renewable energy equipment.

AVERAGE ENERGY BILL FOR ELECTRICITY, FUEL OIL, AND NATURAL GAS

	Electricity[1] (cents per kilowatt hour)	Fuel Oil[2] (cents per gallon)	Natural Gas[3] ($'s per 1000 cubic feet)
Northeast (#1)	11.63		
New York		101.8	$6.01-7.00
New Jersey		96.2	6.01-7.00
Pacific (#2)	9.64		
California		NA	5.01-6.00
Nevada		NA	5.01-6.00
Arizona		NA	5.01-6.00
Hawaii		NA	> 7.01
New England (#3)	9.21		
Connecticut		103.5	> 7.01
Maine		96.0	> 7.01
Massachusetts		99.9	6.01-7.00
New Hampshire		97.4	6.01-7.00
Rhode Island		102.9	6.01-7.00
Vermont		102.1	5.01-6.00
Central Plain (#4)	8.62		
Kansas		NA	3.10-4.00
Iowa		NA	4.01-5.00
Missouri		NA	5.01-6.00
Nebraska		NA	4.01-5.00
Southwest (#5)	8.46		
New Mexico		NA	4.01-5.00
Oklahoma		NA	3.01-4.00
Arkansas		NA	3.01-4.00
Louisiana		NA	3.01-4.00
Texas		NA	3.01-4.00
Mid-Atlantic (#6)	8.10		
Pennsylvania		93.1	5.01-6.00
Delaware		96.7	6.01-7.00
Maryland		94.1	6.01-7.00
District of Columbia		92.4	6.01-7.00
Virginia		89.7	5.01-6.00
West Virginia		87.7	5.01-6.00
Midwest (#7)	8.06		
Michigan		92.0	5.01-6.00
Ohio		86.6	5.01-6.00
Illinois		85.8	5.01-6.00
Indiana		85.1	4.01-5.00
Wisconsin		90.9	5.01-6.00
Minnesota		91.7	5.01-6.00
Southern (#8)	7.41		
Kentucky		NA	4.01-5.00
Tennessee		NA	4.01-5.00
North Carolina		NA	5.01-6.00
South Carolina		NA	5.01-6.00
Georgia		NA	5.01-6.00
Alabama		NA	4.01-5.00
Mississippi		NA	3.01-4.00
Florida		NA	3.01-4.00
Rocky Mountain (#9)	6.91		
Montana		NA	4.01-5.00
North Dakota		NA	5.01-6.00
South Dakota		NA	4.01-5.00
Wyoming		NA	4.01-5.00
Utah		NA	4.01-5.00
Colorado		NA	4.01-5.00
Northwest (#10)	4.78		
Oregon		84.0	5.01-6.00
Washington		85.3	5.01-6.00
Idaho		89.3	5.01-6.00
Alaska		94.1	0.0-3.00

[1] **Electricity:** Figures are for 210 major private power companies and do not includes rates for 2,194 public power systems (which average 30 percent less); rates are not included for 870 rural electric cooperatives. Private power companies provide 78 percent of the nation's electricity.
Figures denote average cost in cents per kilowatt hour at 500 kilowatt hour rate. Nationwide average for 1984: 8.22 cents per kwh. The regional grouping of states is NARUC's. (source: National Association of Regulatory Utility Commissioners, Washington, D.C.).

[2] **Fuel Oil:** Fuel oil prices are for No. 2 distillate at average 1985 residential end-user rates excluding tax. EIA has not gathered information for many states which it considers low volume users. (source: Energy Information Administration, Washington, D.C.).

[3] **Natural Gas:** Natural gas prices are 1985 averages for delivery to all types of consumers in dollars per thousand cubic feet. (source: Energy Information Administration, Washington, D.C.).

Congress also passed the Public Utility Regulatory Policy Act (PURPA) to spur greater competition in the utility industry and provide incentives for development of diverse small power generators. Under this law states were to develop guidelines for assuring competition which advocates hoped would foster development of "least-cost" energy production.

One of the most efficient and immediate electricity production alternatives is cogeneration—using industrial boilers to make both electricity and steam for heating and production processes. The federal office of Technology Assessment estimates a potential for 200,000 megawatts of cogeneration by the year 2000.

Despite the initial headway made by these programs, the potential for energy to be saved or produced, and the threat of new energy crises, the Reagan administration began a dramatic transformation in energy policy in 1981. The new emphasis was on increased production of energy, from traditional sources rather than increased efficiency. The Public Utility Regulatory Policy Act

ENERGY MATRIX

	LEAST COST PROVISIONS & REGULATIONS[1]	INCOME TAX CREDITS FOR SOLAR AND RENEWABLE ENERGY SYSTEMS[2]	TAX CREDIT EXPIRATION DATE	% USE OF AVAILABLE SOLAR ENERGY & ENERGY CONS. BANK 1982-1986		BUILDING CODE PROVISIONS[3]	APPLIANCE EFFICIENCY STANDARDS[3]	CONST.-WORK IN PROGRESS POLICY[4]
				CONSERVATION	SOLAR			
AL	3	N		8.42%	128%			No
AK	3	N		—	—			—
AZ	3	25% res. & comm.	12/87	12.04%	84.88%			partial
AR	2	N		97.67%	—			partial
CA	1	10% res./25% comm.	12/86	79.76%	9.06%	•	•	No
CO	3	30% comm.	12/86	38.88%	—			partial
CT	2	30% comm.	12/86	55.74	87.97			partial
DE	3	$200 flat credited res. only	open-ended	—	8.93			—
FL	1	N		93.95	25.93	•		partial
GA	3	10-20% res. & comm.	12/89	84.11	—			partial
HI	3	15% res. & comm.	12/92	—	53.33			No
ID	2	10% res. only	open-ended	70.30	—			No
IL	1	N		94.01	—			partial
IN	2	25% res. & comm.	12/87	92.06	100			No
IA	1	N		101.19	76.00			No
KS	3	N		82.22	—			partial
KY	3	15% res. & comm.	12/86	74.07	74.00			partial
LA	3	N		—	—			partial
ME	1	20% res.	12/88	79.85	52.00		•	partial
MD	2	N		—	—			partial
MA	2	35% res.	12/87	94.09	97.67	•	•	No
MI	3	15-30% res.	12/88	88	3.25			—
MN	2	N		65.92	11.92	•		partial
MS	3	N		34.74	—			—
MO	2	N		96.42	103.46			No
MT	2	2½ - 5% res. 35% comm.	12/86	43.78	—			No
NE	Public Power	N	12/85	71.83	—			—
NV	1	N		100	—			partial
NH	2	N			76.26			No
NJ	2	N		56.07	—			partial
NM	2	25% res. & comm.	12/89	24.27	87.19			partial
NY	2	N		86.35	7.74	•		partial
NC	2	25% res. & comm.	open-ended	100.50	98.72	•		partial
ND	3	15% res. & comm.	open-ended	26.46	—			short term
OH	2	N		84.82	—			partial
OK	3	55% res./30% comm.	12/90	76.01	—			partial
OR	1	25% res. & 35% comm.	12/89/90	91.54	—			No
PA	2	N		77.80	98.23			partial
RI	3	10% res. & comm.	6/90	72.79	—			No
SC	2	25% res. & comm.	open-ended	50.20	—			partial
SD	3	N		4.54	—	•		No
TN	Public Power	N		79.40	9.13			—
TX	1	N		89.18	—			partial
UT	3	25% res. & comm.	12/90	87.99	107.92			partial
VT	1	N		32.43	—			partial
VA	2	20% res. & comm.	12/86	99.24	73.43			partial
WA	2	N		—	90.23			No
WV	3	N		—	—			partial
WI	1	N		91.92	—	•		partial
WY	3	N		—	—			No

(for more extensive information see Energy Appendix Packet)
(see notes on page 34)

received little support from the federal government and stiff challenges from utility companies and was stalled for five years. Funding for solar technology research and development was slashed from $771 million in 1981 to $176 million in 1986. Federal income tax credits were eliminated for residential purchase of renewable energy equipment in 1985, and business credits were scheduled for phase out. The Residential Conservation Service budget was cut from $9.2 million in 1981 to $400,000 in 1986. Energy conservation funding for institutional buildings was cut from $159 million in 1981 to $52.5 million in 1986. And state energy conservation program funding was cut from $37.2 million to $17.7 million for the same period.[39] The Solar Energy and Energy Conservation Bank was zeroed out of the federal budget. The Department of Energy balked at instituting efficiency standards for appliances mandated by Congress and the President ultimately vetoed a bill for such standards. The Reagan Department of Energy also scaled back the 1979 projection of renewable energy meeting 20 percent of the nation's energy needs to 13 percent.

These policies devastated the fledgling solar and wind industries, and generally undermined state momentum in energy policy-making. As of September 1986, only ten states had passed legislation or adopted regulations to push least-cost energy planning at the state level. And at the end of 1986 five states let solar tax credits expire, with provisions in three more states set for expiration by the end of 1987.

Critics of the Reagan administration maintain that the current oil glut and the 30 percent surplus of electricity in the United States provides an ideal opportunity to make a strong transition to diverse power production, renewable energy sources, and greater energy efficiency during the next decade. The administration, however, maintains its support for traditional energy sources—venturing as far as strategies for a resurgence of nuclear construction in the 1990s.[40]

Several states and individual cities continue to make progress, however. California has seen the most significant development of wind and solar facilities with about 1400 megawatts of wind, 211 megawatts of solar thermal, and 8 megawatts of solar photovoltaic-produced electricity.

In Wisconsin, state energy planners have discovered that the state's forests contain enough wood fuel to supply up close to 30 percent of the state's non-transportation energy needs to the year 2000 and beyond. In addition to their "oil field" in the backwoods, the state utility commission has also ordered utility companies to double their conservation efforts,[41] and is urging utility companies to develop least-cost planning for future energy production. Three states—Massachusetts, California, and Maine—have passed their own appliance efficiency standards. And eight states have formulated building codes which aim at substantially greater energy efficiency for buildings.

Several cities are currently looking at moving beyond piecemeal state conservation planning to more comprehensive models. Austin, Texas which has a nonprofit public power system, has initiated a plan to reduce municipal power demand by 550 megawatts (about 20 percent) by 1997. A similar plan is in the works for New Orleans. And Chicago is examining a variety of options for energy efficiency and alternative power production.[42]

One major difficulty is that electric utilities and other energy suppliers are reluctant to yield their monopoly control and participate in efforts that will mean more competition from diverse small power producers, or energy efficiency that can cut into their growth in sales and profits.

The key to what course events may take rests in large part on price rises in traditional fuels—oil, gas, coal, electricity—and the policy response of federal and state government. In order to move those policies before we encounter a new crisis, institutional changes will be needed. Currently more than two dozen large and small cities are considering replacement of private utility companies that serve them with a nonprofit public system. In other areas, efforts have emerged to improve state regulation of energy companies or replace appointed state regulatory commissioners with elected officials.

Independent power producers are also appealing to state utility commissions to break the monopoly hold private power companies have on electricity generation and allow greater competition in the industry. What the outcome of these efforts will be remains uncertain. But all indications are that the future of renewable energy and energy efficiency and will rely as much on the political decisions at the federal, state and local level as the development of new technologies.

ENERGY SNAPSHOT

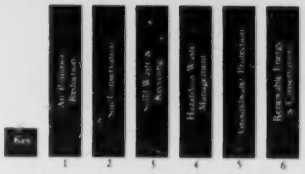
California is widely recognized for its encouragement of renewable energy development. The state has formulated the standards, authority, and regulations to require "least-cost" energy development, and until recently offered substantial tax incentives to independent energy developers. Residential and commercial purchasers of renewable energy systems also have received income tax credit which has helped overcome initial market barriers (residential 10 percent and commercial 25 percent). In addition to such provisions, California has also formulated building codes which require greater energy efficiency, and efficiency standards for a variety of appliances.

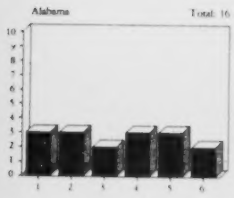
Broadening the use of such policies has run into resistance of temporarily lower fuel prices and federal policies which emphasize boosting traditional energy supply sources, over efficiency measures. Utility and energy companies are also fighting to maintain monopoly control of energy markets and limit competition and efficiency developments that many view as cutting into their growth in sales and profits.

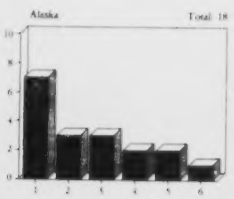
Currently:

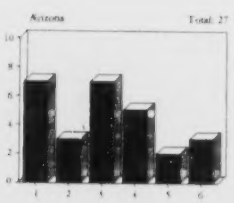
- ten states have developed adequate authority and regulations to mandate least-cost energy planning;
- twenty-four states have offered income tax credits for the purchase of some type of renewable energy equipment;
- tax credits in five states expired December 31, 1985;
- tax credits in three states are set to expire by December 31, 1987;
- fifteen states do not allow construction-work-in-progress charges which have provided automatic funding for utility construction projects;
- three states have passed their own appliance efficiency standards;
- eight states have formulated building codes to substantially improve energy efficiency.

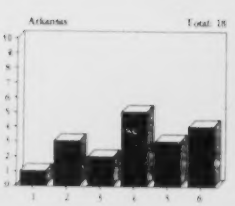
How The States Measure Up

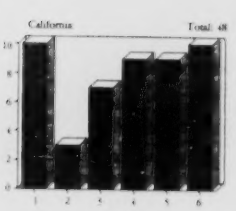


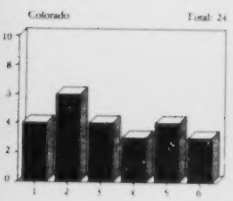


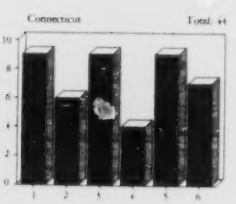


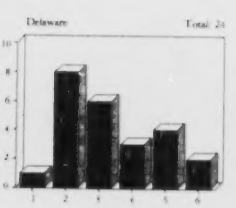


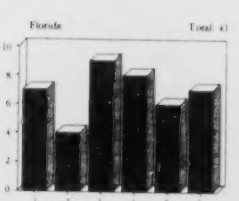


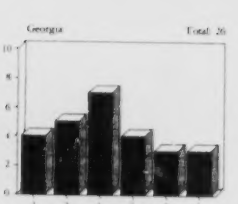


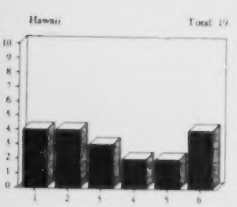


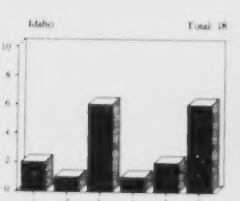


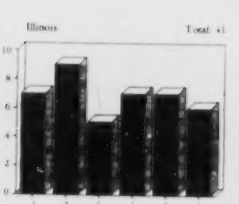


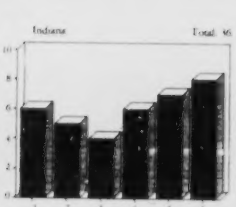


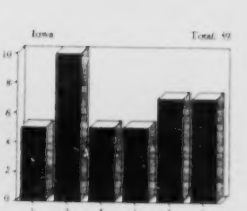


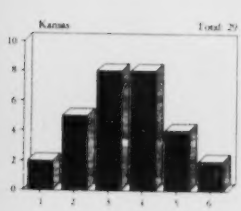


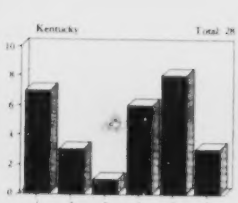


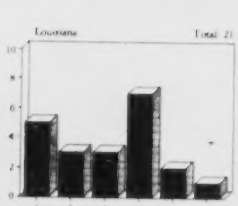


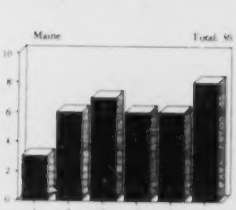


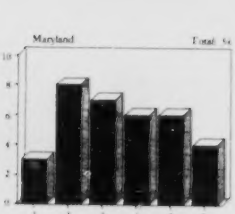


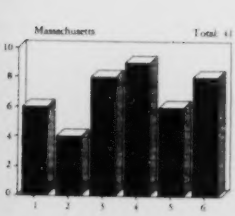


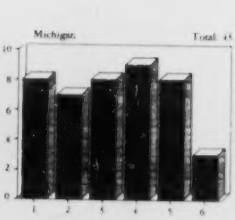


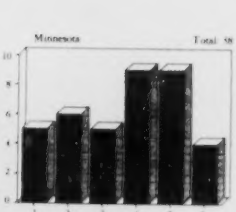


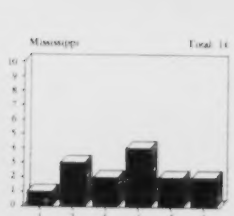


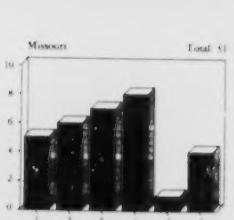




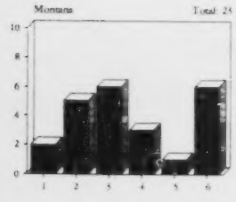


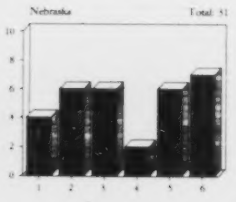


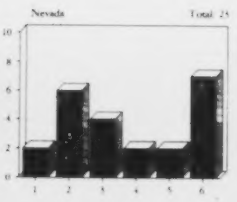


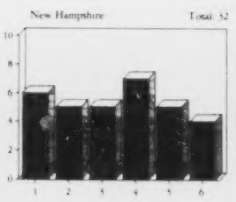


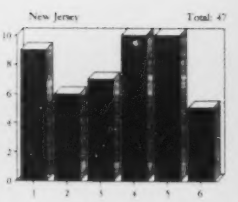
State Ranking Graphs

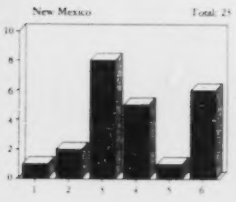


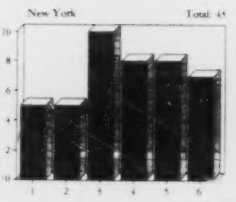


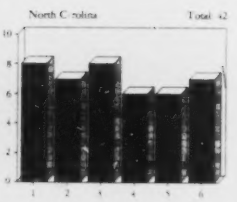


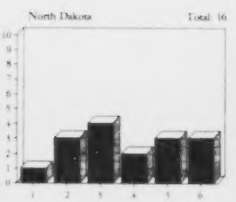


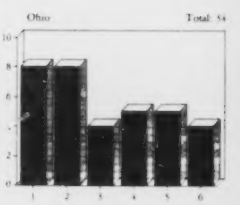


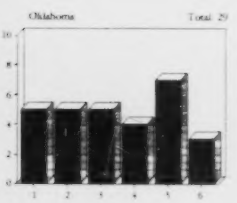


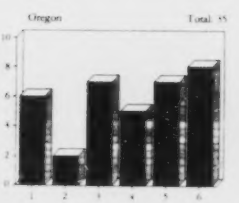


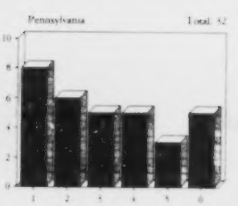


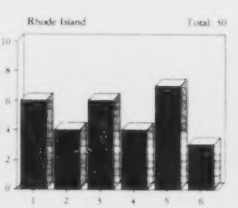


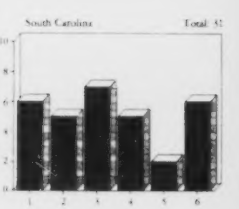


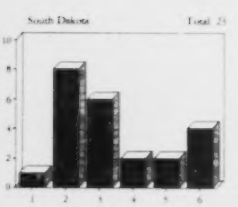


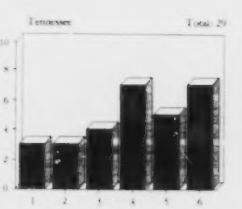


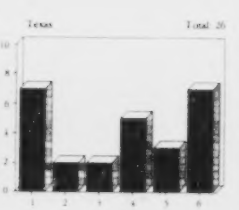


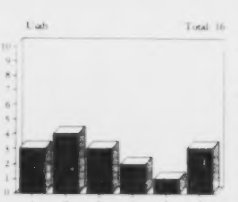


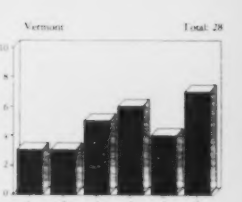


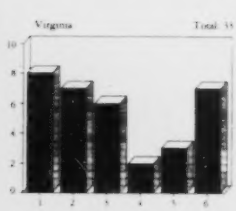


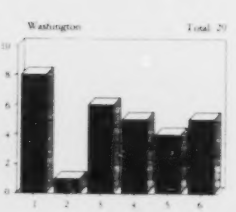


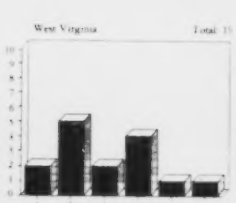


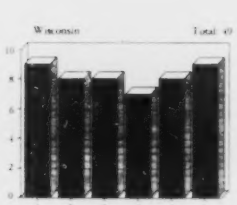


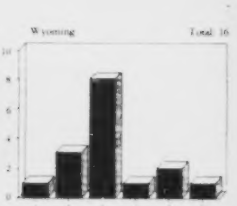












Ranking Notes

States have been ranked on the strength of environmental programs and policies on a scale of one to ten. The total rank is the compilation of points for the six topics examined (potential total of 60 points). The rank is not meant to judge particular environmental conditions in each state, but considers environmental problems as a measure of need for program strength. Key factors weighed against this need are: legislative authority for programs, scope of established programs, extent of funding, monitoring, enforcement, and indications of progress. Although institutionalized programs, rather than innovative projects, are given greater weight—attention is given to assure that states have not simply "papered-over" a problem with new legislation.

In this subjective evaluation, the ranking has a number of shortcomings. For example, the ranking does not address the fact that certain states may be diverting scarce revenues to education, housing, or other badly needed social programs. It also does not address the fact that states with a higher per capita income can divert more funding to environmental issues. And it is dependent on information collected by federal agencies from the state programs.

Key indicators used in the ranking are contained on the matrix pages in this report and in more detailed matrices compiled in appendix packets designed to accompany each topic section. Readers interested in more detailed information on a particular topic, or state ranking for that topic, can request the appropriate appendix packet. (See inside back cover).

Air Pollution

In the final air pollution program rankings attainment/nonattainment status was used as a background against which monitoring, enforcement, legislative, and research activity was judged. Aggressive state programs are those with active total suspended particulate (TSP) and ozone programs; TSP because visible emissions are often the first to be detected and criticized, thereby spurring corrective action, and ozone because it presently constitutes a high priority nationwide problem.

The level of compliance with the federal and/or state regulation was based on the number of deficiencies in the state implementation plans for the criteria pollutants in 1986.

State enforcement activity assessment was based on EPA's Compliance Data System for total enforcement actions. The number of state inspection and notices of violations were considered the best indicators of state enforcement activity. Those sanctions imposed on pollution sources, or violating county or state, as a consequence of deficiencies in the state implementation plan, gave further indication of the presence or lack of state enforcement activity.

Active acid rain and/or toxic pollutant programs were viewed as commitments to move beyond standard air pollution reduction programs. Particular attention was paid to acid rain activity— either state-funded research or control legislation—in those states sensitive to, or contributing heavily to, the problem.

Soil Conservation

The broad background for soil conservation rankings was the amount of tons lost per acre of cropland. Also considered as a broad measure were the percentages of cropland needing erosion control and the amount being tilled with such methods.

Erosion and sediment control laws were seen as essential pieces of soil conservation legislation. Added to this are established soil loss limits and cost-sharing for soil conservation projects. The most effective state programs combined cost-sharing with requirements for approval of land-use plans before soil is disturbed, and adequate enforcement and penalties.

Within the context of a state's erosion problem, and the amount of erosion control undertaken, state and local funds appropriated for soil conservation were considered as indicators of commitment to carry out programs and reduce erosion. Consideration was also made of the states that have seen progress in saving soil between the 1977 and 1982 surveys.

Solid Waste & Recycling

Rankings were based on a number of factors in managing solid waste and reducing the threats of pollution of air, soil, and water by solid waste facilities. Particular attention was given to recycling as the most cost-effective and environmentally benign method of waste management.

Landfill disposal, the traditional waste management strategy, was assessed for enforceable protection requirements and standards. Also considered were the extent and frequency of monitoring programs (including groundwater, surface water, air, and methane monitoring), and the total number of inspections for 1984. These measures were compared to the total number of solid waste landfills and estimated tonnage of solid waste generated by each state.

State recycling programs were ranked according to the extent of legislative and program activity, focusing on both waste reduction incentives and market development. Indicators of a comprehensive recycling program included: mandated waste reduction, litter control legislation, recycling goals as a percentage of the total waste stream, and EPA approved solid waste plan, bottle bills, tax incentives, state grants, landfill surcharges and other fundraising mechanisms, used oil and tire recycling programs, consumer education, and state procurement of recycled products.

Hazardous Waste

The primary indicators of hazardous waste problems were the number of sites on the National Priority List, the number of sites on the Emergency Response and Remedial Investigation List, and the estimated amount of hazardous waste generated. Seven state program initiatives were assessed: state superfund provisions, underground injection controls, final authorization for pre-HSWA programs, small quantity generator regulations more stringent than the federal program requires, community right-to-know laws, incentives to reduce/recycle hazardous wastes, and household hazardous waste collection.

State superfund programs were weighted most heavily in the determination of state rankings. For a state to be considered as having a superfund program separate from EPA's, a statute or statutes must enable the state to assess hazardous waste sites and initiate remedial cleanup actions, and/or empower the state to enforce action by responsible parties when deemed necessary.

Groundwater Protection

The broad indicators of a need for groundwater protection are the amount of groundwater withdrawal per day and the percentage of population served by groundwater. Legislative authority to implement a strategy plan and the existence of a plan were considered essential to progress. Added to this are programs for mapping, groundwater quality standards with more than two categories, and state policies for controlled land-use areas. The strongest state programs allowed for a variety of monitoring at suspected contamination sites, had well-integrated state and local programs, and advocated non-degradation or limited degredation of groundwater supplies.

Consideration was also made of the existence or extent of laws and regulations addressing leaking underground storage tanks.

Renewable Energy and Conservation

State energy rankings were based on the fact that every city and state must undertake comprehensive energy planning. The emphasis was on states which are attempting to institutionalize energy efficiency into building codes, tax structures, and regulatory policies. Primary consideration was given to states which have formulated comprehensive laws for "least-cost" energy planning. The formulation of tax credits for solar and renewable energy systems, and the utilization of grants and loans from the Solar Energy and Energy Conservation Bank were also assessed as signs of a state's interest and ability to support vital technological progress and savings of fossil fuels.

In addition to these primary indicators, assessment was also made of state policies which allow construction-work-in-progress charges that have encouraged overbuilding of centralized energy systems and undermined renewable energy and energy efficiency development.

Matrix Notes

The matrix for each topic section of this main report is condensed from several matrices on each topic contained in the corresponding appendix packet. The notes below describe the topic headings, numerical assessments given to the comprehensiveness of various programs and policies, and the sources of information.

Air Matrix

1. SIP signifies State Implementation Plan. SIP deficiencies include both major and minor inadequacies in the state's plan for controlling sources and pollutant levels. (source: US EPA, *Actions on Deficient SIPs and Other Nonattainment SIPs*, in-house data base, Office of Air and Radiation, Washington, DC, 1986).

2. "Designated areas" are areas designated for air quality planning purposes. Criteria pollutants include:
   - C= Carbon Monoxide
   - N= Nitrogen oxides
   - S= Sulfur oxides
   - O= Ozone
   - T= TSP (particulate matter evaluated in terms of total suspended particulates, TSP)

(source: *Code of Federal Regulations*, Office of the Federal Registrar, Washington, DC, Number 40, Parts 81 to 99, 1985).

3. Total Monitors includes monitors from both the National Air Monitoring Network System (NAMS), and the State and Local Air Monitoring Network System (SLAMS). (source: State and Territorial Air Pollution Program Administrators, "FY85 State Funding Surveys," unpublished, Washington, DC, April, 1984).

4. Total enforcement actions includes notices of violation, inspections, source tests, warning letters, etc. (source: US EPA, "Enforcement Actions and the 1986 Air Quality Attainment/Nonattainment Status," EPA Compliance Data System, Washington, DC, 1986).

5. See text for an explanation of appropriate sanctions. (source: US EPA, *Actions on Deficient SIPs and Other Nonattainment SIPs*, in-house database, Office of Air and Radiation, Washington, DC, 1986).

Soil Conservation Matrix

1. Statewide conservation programs are fundamental to soil conservation. (source of data: Eugene Lamb, Program Analyst, National Association of Conservation Districts, Washington, DC, August 1986)

2. Erosion and sediment control laws, soil loss limits, and other state provisions are the next stage of soil conservation policy. (source of data: "Summary of Principal Provisions of State Laws Providing for Erosion and Sediment Control," prepared by Mary Gardner, National Association of Conservation Districts, Washington, DC, July 1985).

3. Sheet and rill erosion are the primary types of damage to cropland soil. (source of data: USDA, National Resources Inventory, Washington, DC, 1982)

4. Figures on soil requiring conservation tillage are from: National Survey of Conservation Tillage, Washington, DC, 1983

5. Figures on funds appropriated are from: USDA, Agricultural Statistics, Washington, DC, 1985

Solid Waste Matrix

1. Solid waste management data as of June 1986. Symbols mean:
   - 1= EPA approved
   - 2= EPA partially approved
   - 3= adopted plans and submitted them for EPA review
   - 4= drafts of state plan are under state or EPA review
   - 5= has not submitted a plan

(source: US EPA, State Programs Branch, Office of Solid Waste, Washington, DC, 1986).

2. Landfill regulations symbols mean:
   - 1= examination of 31 specified landfill requirements: all or most requirements were explicitly included in state regulations
   - 2= approximately half the 31 requirements are specifically included under state regulations with a few requirements not enforceable under any policies.
   - 3= few requirements are specifically included in state legislation, though all or most are enforceable under general standards and policies.

4= almost no enforceable requirements (source: US EPA, "State Subtitle D Program Questionnaires," unpublished, Office of Solid Waste, Washington, DC, 1986).

3. Recycling program symbols mean:
1= the most comprehensive recycling programs with respect to state funding, market development and mandating waste reduction. New York's and Pennsylvania's proposed programs are included in this category.
2= state funded programs with an emphasis on recycling legislation and market development.
3= state programs with zero or limited funding but nevertheless have taken a step, or several steps, towards reducing litter, and/or developing markets for recycled products.
4= state programs with zero or limited funding that restrict efforts to some state purchase of recycled paper, a recycling hotline, etc., or leave recycling to the private sector.
(source: information gathered primarily from back issues of *Resource Recycling*, and *Biocycle* magazines).

4. Frequency of inspections represents the frequency with which 60 percent of the landfills are inspected in each state. " < " = less than; " > " = greater than. (source: US EPA, "State Subtitle D Program Questionnaires," unpublished, Office of Solid Waste, Washington, DC, 1986).

5. State solid waste tonnage is based on 3.5 pounds per person per day multiplied by state population.

Hazardous Waste Matrix

1. State superfund is defined by statutes authorizing a state to assess hazardous waste sites and to initiate remedial clean-up actions, and/or to enforce assessment by responsible parties when deemed necessary. States which have this authority and do not actively exercise it, are not included on the matrix. (source: phone conversations with individual state officials).

2. Small quantity generator regulations that are more stringent than the federal standards that took effect on September 22, 1986. (source: phone conversations with regional EPAs).

3. Pre-HSWA final authorizaton includes states which fulfilled requirements of the 1976 Resource Conservation and Recovery Act (RCRA) set forth prior to the Hazardous and Solid Waste (HSWA) amendments of 1984. (source: US EPA, "States Granted Final Authorization for Pre-HSWA Program as of May 15, 1986, Office of Solid Waste, Washington, DC, 1986).

4. Right-to-know laws usually address hazardous materials, not hazardous waste, but serve nevertheless as a measure of a state's responsiveness to the role and rights of local communities. (source: "Hazardous Waste News," Thompson Publishing Group, Washington, DC, May, 1986, Vol. III, pp. 3-6).

5. Incentives to reduce/recycle hazardous wastes are classified as financial, institutional, and other. For individual state incentives to reduce/recycle hazardous waste, see the appendix on hazardous waste. (source: *Hazardous Waste Management: A Survey of State Legislation, 1982*, prepared by National Conference of State Legislatures, Denver, Colorado, 1982).

6. Household hazardous waste program symbols mean:
S signifies Statewide
C/L signifies County or Local level
These programs may be ongoing, annual or one-time events.
(source: "Overview of Nationwide Small Quantity Generator and Household Hazardous Waste Collection Programs," prepared by Linda Dunphy, Environmental Task Force, Washington, DC, March, 1986).

7. Emergency Response and Remedial Information System (ERRIS). (source: National Campaign Against Toxic Hazards, Washington, DC, 1986).

8. Source of hazardous waste generation ranking: EPA contractor study, noted in *The Toxic Substances Dilemma*, National Wildlife Federation, Washington, DC, 1980), p.79.

Groundwater Protection Matrix

1. Legislative authority to implement a groundwater strategy plan is one of the most fundamental measures a state can undertake. (source of state breakdown: Association of State and Interstate Water Pollution Control Administrators, Washington, DC, America's Clean Water—the States' Nonpoint Assessment, 1985)

2. Leaking underground storage tank legislation information is from US EPA, Office of Underground Storage Tanks, Washington, DC, 1986).

3. Nondegradation policy information is from: ASIWPCA, 1985.

4. Monitoring information is from: US EPA, Office of Groundwater Protection, Washington, DC, State Groundwater Summaries, Vol 2, 1985.

5. Figures on groundwater consumption and withdrawal are from: USGS National Water Summary, Washington, DC, 1984.

Renewable Energy and Conservation Matrix

1. Least-cost energy policies of the states were examined by Public Citizen's Critical Mass Energy Project in 1985. The numerical assessment is based on their evaluation of progress of a state toward a comprehensive model for least-cost energy strategies
1= comprehensive regulatory authority and policies in place which require integrated planning and investment process for utilities.
2= state has made some progress toward least-cost planning process and has some control over utility investment
3= state has made little progress in implementing policies and authority to encourage least-cost strategies
(source: Critical Mass Energy Project, Least-cost Electrical Planning: Is There Really a State Movement?, Washington, DC, Dec. 1985).

2. This column addresses state income tax credits only, not rebates or sales tax exemption. Policies for income tax exemption vary widely, but following federal legislation, general trend is to let state credits expire.
N= signifies no income tax credits available
(source: Solar Rating and Certification Association, State Solar Directory, Washington, DC, 1985, and personal communication with state officials).

3. More than 80 percent of the total funding for the federal Solar Energy and Energy Conservation bank was applied to conservation and not solar measures. (source of data: Solar Energy and Energy Conservation Bank, data printout, Washington, DC, July 1986).

4. Although many states have minimal requirements for energy efficiency in new buildings, those with the most

substantial standards are included here. (source: National Conference of States on Building Codes and Standards, Herndon, Virginia).

5. Many states are also formulating appliance efficiency standards, in the absence of a federal law, however, only three states currently have such laws. (source: American Council for an Energy-Efficient Economy, Washington, D.C.)

6. State regulatory policies play an important role in energy development. Construction-work-in-progress charges have been a primary mechanism which allowed the overbuilding of electric generating plants in the 1970s and early 1980s— encourging centralized energy development—wasting energy capital and resources, and undermining the growth of renewable energy technologies. (source of CWIP breakdowns: Solomon Brothers, Electric Utility Regulation—Semiannual Review, New York, New York, February 1986).

Text Notes

Air Pollution Reduction

1. The study is cited in *An Environmental Agenda For The States*, (Washington, D.C.: Conference on Alternative State and Local Policy, 1984), p. 2.

2. Richard A. Liroff, *Reforming Air Pollution Regulation. The Toil and Trouble of EPA's Bubble*, (Washington, D.C.: The Conservation Foundation, 1986).

3. "Actions on Deficient SIPs and Other Nonattainment SIPs," (in-house data base printout), (Washington, D.C.: US EPA Office of Air and Radiation, 1986).

4. "Air Trends Fact Sheet" summarized from EPA's *National Air Quality and Emissions Trends Report, 1984*, (Washington, D.C.: US EPA) April 1986.

5. *Air Review*, California Air Resources Board, vol. 1, no. 1, May 1986.

6. *Status of State Air Pollution Control Programs*, Washington, D.C.: State and Territorial Air Pollution Program Administrators, April 1984.

Soil Conservation

7. Edwin Clark, II, Jennifer A. Haverkamp, and William Chapman, *Eroding Soils: The Off-Farm Impacts*, (Washington, D.C.: The Conservation Foundation, 1985), p. xviii.

8. Marc Leepson, "Soil Erosion: Threat to Food Supply," *Congressional Quarterly*, vol. 1, no. 12, 1984.

9. National Resource Inventory, US Department of Agriculture, 1977.

10. National Resource Inventory, USDA, 1977; also see matrix for state breakdown.

11. National Resource Inventory, 1982; and "Iowa Funds 2000 Projects in 1983," *Conservation Focus*, (Washington, D.C.: National Association of State Departments of Agriculture), vol. 1, no. 5, May 1984.

12. "Conservation Ethics Overcome Mistrust of Local Regulations," *Conservation Focus*, vol. 1, no. 6, July 1984.

13. "Illinois," *Conservation Focus*, vol. 1, no. 7, September 1984.

14. Ward Sinclair, "Soil Conservation and Budget Erosion," *Washington Post*, December 12, 1986, p. A21.

Solid Waste and Recycling

15. The waste composition breakdown is from: "Characterization of Municipal Solid Waste in the United States 1960 to 2000," (prepared as part of a report to be issued by US EPA in 1987), Franklin Associates Ltd. The breakdown for the amount of waste recycled, landfilled or incinerated is from personal communication with Neil Seldman, Institute for Local Self-Reliance, Washington, D.C.

16. Neil Seldman, Institute for Local Self-Reliance.

17. For legislative history on solid waste issues see: Deahn Berrini,"New Opportunities for Citizen Suits," *RESOURCES*, (Washington, D.C.: Environmental Task Force), Summer 1986).

18. Personal communications with staff of U.S. EPA: Office of Solid Waste and Emergency Response.

19. *Solid Waste Management Plan Draft Update 1985-2000*, New Jersey Department of Environmental Protection, Division of Solid Waste Management, 1985.

Hazardous Waste Management

21. Personal communication with Joel Hirshhorn, Office of Technology Assessment.

22. Joel Hirschhorn, OTA.

23. Joel Hirschhorn, OTA.

24. EPA contractor study noted in *The Toxic Substances Dilemma*, (Washington D.C.: National Wildlife Federation, 1980) p. 79.

25. Michael Weisskopf, "Superfund Pact Reached, But Veto Is Threatened," *Washington Post*, November 3, 1986, p. A4.

26. *Superfund: A Five Year Progress Report*, (Washington, D.C.: National Campaign Against Toxic Hazards, September 1985) p. 13.

27. Personal communication with Massachusetts Department of Environmental Quality Engineering staff, November 1986.

28. "Improved Hazardous Waste Management: Getting From Here To There," (project summary), Environmental and Energy Study Institute, May 1985.

Groundwater Protection

29. "Postmortem at Wilsonville," *The Nature of Illinois*, vol. 1, no. 1, Summer 1986 (Society for the Illinois Scientific Surveys).

30. Fred Mosley, "Gasoline and Groundwater Contamination," (background paper) (Washington, D.C.: Northeast-Midwest Institute, June 1985); and also: David V. Feliciano, "Groundwater Contamination from Petroleum Underground Storage Tanks and Associated Liability," (Washington, D.C.: Congressional Research Service, October 15, 1985).

31. *A Congressional Agenda To Prevent Groundwater Contamination: Building Capacity To Meet Protection Needs*, (Washington, D.C.: Environmental and Energy Study Institute, 1986) p. 46.

32. Newsletter of Science for Citizens Center, Western Michigan University, Summer 1985.

33. Gov. Anthony S. Earl, "Budget Puts Environment At Risk," *State Government News*, February 1986, pp. 8-10.

34. *A Congressional Agenda To Prevent Groundwater Contamination*, Environmental and Energy Study Institute.

Renewable Energy and Conservation

35. Predictions of brownouts and blackouts and increasing imports of oil from the Middle East are contained in many Reagan administration statements and documents. For example, see: "Remarks by Commissioner Lando Zech Jr. at Edison Electric Institute Governmental Affairs Conference, Marco Beach, Florida, January 16, 1986;" and Energy Secretary John Herrington's speech before the Nuclear Power Assembly, May 8, 1985, in Washington, D.C.

36. For a chart showing the declining energy demand projections, see: Stephen W. Sawyer, *Renewable Energy: Progress, Prospects*, (Washington, D.C.: Assn. of American Geographers, 1986) p. 10.

37. Alvin Kaufman, and Dr. Langdon Crane, "A Perspective on Utility Capacity," (Washington, D.C.: Congressional Research Service, 1984).

38. Chris Flavin, *Renewable Energy At The Crossroads*, (Washington, D.C.: Center for Renewable Resources, 1984).

39. See federal appropriation for 1981 and 1986 published in the *Federal Register*.

40. *Strategic Plan for the Civilian Reactor Development Program*, (draft) (Washington, D.C.: Department of Energy, October 1985).

41. "Wood Fuel Could Be Wisconsin's Oil Well," *Wisconsin Energy News*, vol. 7, no. 5, September/October 1986.

42. For a sense of the local interest in taking over private power companies see: "Chicago May Pull the Plug on Edison," *Chicago Tribune*, October 11, 1985, p. 1; and also "Time to Buy Out NOPSI," *Gambit*, January 19, 1985.

Additional Sources of Information

Air

Acid Rain Foundation, Inc.
1630 Blackhawk Hills
St. Paul, MN 55122
Dr. Harriet Stubbs
(612) 455-7719

Acid Precipitation Digest
Center for Environmental Information, Inc.
33 South Washington St.
Rochester, NY 14608
Fred Stoss
(716) 546-3796

American Lung Association
1740 Broadway
NY, NY
Ronald White
(212) 315-8720

National Clean Air Coalition
530 Seventh Street, SE
Washington, DC 20003
Richard Ayres
(202) 543-8200

State & Territorial Air Pollution Program Administrators
444 N. Capitol St, NW
Washington, DC 20001
Bill Becker
(202) 624-7864

Soil Conservation

American Farmland Trust
1717 Massachusetts Ave, NW
Washington, DC 20036
Jim Riggle
(202) 332-0769

American Land Resource Association
5410 Grosvenor Lane
Bethesda, MD 20814
Hal Hiemstra
(301) 493-9140

National Association of State Departments of Agriculture
1616 H Street, NW
Washington, DC 20006
Nancy Bushwick
(202) 628-1566

Soil Conservation Service (USDA)
Independence Ave betw 12th & 14th, SW
Washington, DC 20250
Gary Nordstrom
(202) 447-6267

U.S. Government Accounting Office
300 C Street, SW
3rd floor
Washington, DC 20250
John Murphy
(202) 475-4880

Solid Waste & Recycling

Association of State & Territorial Waste Management Officials
444 N. Capitol St, NW
Washington, DC 20001
Kerry Callahan
(202) 624-5828

Biocycle Magazine
Box 351
Emmaus, PA 18049
Jerry Goldstein
(215) 967-4135

Environmental Task Force
1012 14th St, NW
15th Floor
Washington, DC 20005
Ruth Lampi/Rick Parish
(202) 842-2222

Inform, Inc.
381 Park Ave
NY, NY 10016
Allen Hershkowitz
(212) 689-4040

Institute for Local Self-Reliance
2425 18th St, NW
Washington, DC 20009
Neil Seldman
(202) 232-4108

National Recycling Coalition, Inc.
5800 Ogden Court
Bethesda, MD 20816-1265
E. Gifford Stack
(301) 320-3535

Resource Recycling Magazine
PO 10540
Portland, OR 97210
Jerry Powell
(503) 227-1319

Hazardous Waste

Citizen's Clearinghouse for Hazardous Wastes
2315 Wilson Boulevard
Suite A
Arlington, VA22201
Lois Gibbs
(703) 276-7070

Environmental Action Foundation
1525 New Hampshire Ave, NW
Washington, DC 20036
Dan Becker
(202) 745-4871

National Campaign Against Toxic Hazards
317 Pennsylvania Avenue, SE
Washington, DC 20003
Hank Cole
(202) 547-1196

National Center for Policy Alternatives
2000 Florida Ave, NW
Washington, DC 20009
Jeffrey Tryens
(202) 387-6030

National Coalition Against the Misuse of Pesticides
530 7th St, SE
Washington, DC 20001
Jay Feldman
(202) 543-5450

Southwest Research & Information Center

PO Box 4524
Albuquerque, NM 87106
Don Hancock
(505) 262-1862

2001 O Street, NW
Washington,DC 20036
Caroline Petti
(202) 457-0545

"Hazardous Waste News," and "Right-to-Know News"
Thompson Publishing Group
1725 K St, NW Suite 200
Washington, DC 20006
Janis Adkins
(202) 872-1766

Groundwater Protection

Clean Water Action
317 Pennsylvania Avenue, SE
Washington,DC 20003
John Scott
(202) 547-1196

Congress of the U.S.
Office of Technology Assessment
Washington, DC 20510
Joan Harn
(202) 226-2032

Environment & Energy Study Institute
410 First St, SE
Washington, DC 20003
Judy Campbell Bird
(202) 863-1900

National Audubon Society
645 Pennsylvania Ave, SE
Washington, DC 20003
Maureen Hinkle
(202) 547-9009

Sierra Club
330 Pennsylvania Ave, SE
Washington, DC 20003
Daniel Weiss
(202) 547-1141

U.S. Geological Survey
National Water Summary
407 National Center
Reston, VA 22092
Wayne Solley
(202) 648-5670

U.S. Government Accounting Office
441 G St, NW
rm 5844
Washington, DC 20548
Ken Litkowski
(202) 275-1774

Association of State and Interstate Water Pollution Control Administrators
444 N. Capitol St, NW
Washington, DC 20001
Linda Eichmiller
(202) 624-7782

Renewable Energy & Conservation

Critical Mass Energy Project
Public Citizen
215 Pennsylvania Ave, SE
Washington, DC 20003
Ken Bossong/Joe Kriesberg
(202) 546-4996

Energy Conservation Coalition
Environmental Action Foundation
1525 New Hampshire Ave, NW
Washington, DC 20036
Paul Markowitz
(202) 745-4871

American Council for an Energy-Efficient Economy
1001 Connecticut Ave, NW
Washington, DC 20036
Howard Geller
(202) 429-8873

About the Author:

Scott Ridley is a Washington, D.C., policy analyst and author. His articles have appeared in *The New Republic, The Nation, Denver Post, Newsday,* and a number of magazines and newspapers, and he has testified before Congress as well as state and local governments. In 1985 he co-authored *The Hidden Costs of Energy.* He recently co-authored the book *Power Struggle,* published by Harper and Row in October, 1986. Copies of this book can be obtained by writing to the Fund For Renewable Energy and the Environment (FREE), 1001 Connecticut Ave, NW, suite 638, Washington, DC 20036.

SPONSORS:

The George Gund Foundation
The William and Flora Hewlett Foundation
Albert A. List Foundation, Inc.
The New-Land Foundation
Jessie Smith Noyes Foundation
Rockefeller Brothers Fund
Rockefeller Family Philanthropic Office

WITH SPECIAL THANKS TO:

William Beal, Office of Air Quality Planning and Standards, EPA
William Becker, State and Territorial Air Pollution Program Administrators
Judy Campbell Bird, Environmental and Energy Study Institute
Paul Doyle, Conference of State and Local Governments
Jerry Goldstein, Biocycle Magazine
Richard Keller, Maryland Energy Office
Joseph Kriesberg, Critical Mass Energy Project
Eugene Lamb, Soil Conservation Service
Ruth Lampi, Environmental Task Force
Gary Liss, National Recycling Coalition
Jack Macy, Massachusetts Dept of Environmental Quality Engineering
Paul Markowitz, Environmental Action Foundation
Robert C. Marshall, Jr., Office of Air Quality Planning and Standards, EPA
Andy McCutcheon, Reynolds Aluminum
James F. Michael, Office of Solid Waste, EPA
Gary Olson, New Hampshire Resource Recovery Association
Jerry Powell, Resource Recycling Magazine
Jim Riggle, American Farmland Trust
Neil Seldman, Institute for Local Self-Reliance
Dawn Schauer, Biocycle Magazine
Richard P. Schifter, Attorney
Jim Souby, Council of State Policy and Planning Agencies
Jeffrey Tryens, National Center for Policy Alternatives
Ronald White, American Lung Association
LaVerne Woods, Attorney

BOARD MEMBERS/OFFICERS

Denis Hayes, Attorney, San Francisco
Tina Hobson, Executive Director, FREE
Eddie Albert, Actor/Environmentalist
Lester Brown, President, Worldwatch Institute
Michael Corbett, Designer and Developer, Village Homes
Tom Coyle, Deputy Director and Treasurer, FREE
Jim Hightower, Texas Agricultural Commissioner
Amory Lovins, Director of Research, Rocky Mountain Institute
Hunter Lovins, President, Rocky Mountain Institute
Mollie Miller, Environmental Consultant (International)
Richard Ottinger, Professor, Pace University and former Member of Congress
Robert Rodale, Chairman of the Board, Rodale Press
Patricia Shelby, former President General, Daughters of the American Revolution

POLICY ADVISORY COMMITTEE

Chris Flavin, Worldwatch Institute
Ruth Caplan, Environmental Action
Garth Youngberg, Institute for Alternative Agriculture
Steve Brobeck, Consumer Federation of America
Alan Miller, The Washington College of Law, American University
Jim McKenzie, World Resources Institute

PROJECT STAFF

Scott Ridley, Author
Amy Sapowith, Principal Researcher
Eileen Fesco, Research Assistant
Brad Wye, Cartographer
Marsha Lederman, Design and Illustration
Lexicon Graphics, Design and Layout

Sections of this report may be reproduced in magazines and newspapers with acknowledgement to the Fund For Renewable Energy and the Environment. The statements and views expressed do not necessarily represent those of the sponsors and contributors to this publication.

ORDERING INFORMATION

Appendix Packet	Price
Air	$5.00
Soil	7.50
Solid Waste	7.50
Hazardous Waste	5.00
Groundwater	7.50
Energy	5.00
Main Report	$10.00
Report and all Appendices	$25.00

Payment or institutional purchase order must accompany order. Make checks payable to FREE. Bulk prices available upon request.

Mail to: FREE, 1001 Connecticut Avenue, NW Suite 638, Washington, D.C., 20006

Fund for Renewable Energy & the Environment
1001 Connecticut Avenue, N.W., Suite 638
Washington, D.C. 20036
(202) 466-6880

Non-Profit Org.
U.S. Postage
PAID
Washington, D.C.
Permit No. 856